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The Farmer's Digest

Volume 10 August-September, 1946 Number 4

How Does Your Farm Compare?

Condensed from Kansas Farmer

Dick Mann

ABOUT 800 farmers in Kansas have turned the spotlight on their farm operations thru membership in the Kansas Farm Management Association. What they get for their money, time and effort, makes an interesting story.

Only four states in the United States offer a farm management service. They are Kansas, Iowa, Minnesota and Illinois. In Kansas there are four associations serving 67 counties. The Kansas organization was started in 1930 with first yearly records analyzed by the association in 1931.

All activities are carried on under a budget. Federal and state funds pay part of the salaries of the personnel required to oversee the work and for summarization and analysis of the Farm and Home Account books. All other funds come from membership dues.

Information obtained from summaries and analyses of books is made available to all farm families of the state by means of news articles, circular letters, bulletins, and by radio.

This does not mean that a farmer member's business becomes public property. His book goes in to the college designated only by a number, and all information contained in it is analyzed from an impersonal standpoint.

A farmer can choose one of 2 services offered by the associations, with cost of membership varying with service desired.

At a cost of $20 a year up to this year, when annual dues were raised to $25, a farmer could receive two visits a year from an association field representative. During field stops the representative spends about half his visit going over farm records with the member, and the other half going over the farm to answer any questions the member might have about management or marketing.

The member also gets the as-

Reprinted by permission from the Kansas Farmer, April 20, 1946, Topeka, Kansas

sociation news letter, market forecast, a farm record book, a yearly business analysis, averages of figures on other farms in his area for comparison with his own, and help in preparing his income tax. For an extra $5, the member can receive a third visit from a field representative during the year.

Dues mentioned here apply to all but association No. 2, where membership is on a sliding scale from $16 to $50, based on number of acres in the farm.

At the end of the year, books are sent in to Kansas State College, where they are analyzed for comparison with other farms in the same type-of-farming area.

Associations are formed by type-of-farming areas so farmers can get comparative figures on farms similar to their own. There is no way to get a fair comparison between farms say, in Eastern Kansas, with those in Western Kansas. For instance machinery costs to the acre in Kansas may range from about $4.75 an acre in the extreme west to about $9 an acre in Eastern Kansas. In Western Kansas most labor is temporary while in the east there is more year-around help used. There are many other factors, such as terrain, size of fields, and kinds of farm programs, that prevent comparisons except within restricted areas.

According to farm management experts, the 4 best measures of a farm business are: "Size of farm, crop yields, livestock returns, and efficient use of labor and equipment."

A study of farm records shows there are certain characteristics that separate high-income farms from low-income farms. Farms in the upper 25 per cent income bracket in any area of the state will have some of the following characteristics: Larger size (investment and acres); greater volume of business, higher crop yields, higher production per unit of livestock, lower machinery cost to the crop acre, lower expenses for $100 of gross income, higher gross income to the man.

Those farmers no better than average in any characteristic, had an average net income of $1,069 in 1944; those superior in one characteristic had an average net income of $1,558; those superior in 2 had an average net of $3,049; those superior in 3 a net income of $3,643; superior in 4 a net of $6,007; and superior in 5 a net income of $7,697. Thus, we see that the farmer superior in 5 of the 7 important characteristics had a net income advantage in 1944 of $6,628 over the man superior in only one characteristic.

During 1944, the average gross income for farmers in Area 5 was $9,402; the average yield of principal grain crops was: corn, 34.4

bushels; wheat, 20.1 bushels; grain sorghums, 28.8 bushels. Average machinery cost to the crop acre was $7.35. Expenses for each $100 of gross income averaged $65.38, and gross income to the man $5,223.

You can see from these figures that when a farmer gets his yearly analysis of all farms in his area, he can compare his farm with those in the upper 25 per cent, the lower 25 per cent, and the average on all phases of farm production and expenses.

Without this chance for comparison, a farmer might know what his costs are and still not be aware they are too high. His machinery cost an acre or his labor cost for $100 of gross income might be out of line. Unless he knows what other farm figures are on these items he has no way of telling where to adjust.

During a 2-day trip with Mr. Taylor, one of the fieldmen, over Area 5, we were impressed by the fact that every farm is individual in its natural advantages and disadvantages. There is no blanket program that will be successful on every farm, even in the same area. The job of a farm manager is to find out what his natural advantages are and to build his farm program around those advantages. Helping him do this is an important part of the Farm Management Program.

One of the jobs of the fieldman is to catch errors made by the farmers thru the year so analyzing the books will be accurate at the end of the year.

Elmer Bock, Chase county farmer, has been keeping records since 1939. His experience proves the value of adopting a farm program to fit natural advantages of the farm. When he lived in Riley county his records showed sheep as his most profitable enterprise. So, he made sheep the major project. On his present Chase county farm, a cattle program works better. Mr. Bock had planned on a cow herd but his association fieldman convinced him that a calf deferred-feeding plan would be better for his farm. He now is convinced the fieldman was right.

Mr. Bock said he tried to keep records before joining the association but always dropped out in July when the field work became heavy. One advantage of the association, in his opinion, is that the fieldmen keep up his interest in the records. He finds considerable satisfaction now in comparing current records with those of past years to see what progress he is making.

George Gammell, of Chase county, has been keeping records and has been in the association for 13 years. His records have caused him to switch from so much wheat to more feed crops. He hasn't dropped any projects as complete failures, but empha-

sizes those projects shown by his records as most profitable.

On projects that run for a year or more, you can't possibly know how much money you have invested unless you have records, says W. C. Bowden, of Dickinson county. He has been keeping records in the association for about 7 years. Chickens were found to be one of his best-paying projects and are given major consideration, along with grain and a deferred calf-feeding project.

Summing up, Mr. Taylor says: "It is important for a farmer to find the natural advantages of his farm and to make the best use of them. He will make more profit if he does 2 or 3 things well and doesn's scatter his efforts over too many projects. Keeping a good set of records and knowing how to interpret them will help him in a hundred ways."

Help for Hay Fever Victims

Cheap and effective control of ragweed pollen as a relief measure for hay fever sufferers has been brought nearer realization by tests with the new herbicide, 2,4-D.

Scientists at the New York experiment station, Geneva, recently reported that areas infested with ragweed last summer were treated successfully with a spray containing only one-tenth of 1 per cent of 2,4-D. When applied in early stages of flower development, pollen growth was checked completely. Only one application, made about the first of August, was necessary.

In the tests, the material was applied with a knapsack sprayer at the rate of 100 to 200 gallons to the acre. A preliminary trial was also made with a "fog" machine to test the practical possibilities of spreading the weed control material over large areas with equipment of this type. It was found possible to fog it over an area of mixed weeds, at the rate of one to two gallons to the acre of a 1 per cent solution of 2,4-D in oil from a machine mounted on a slowly moving truck.

Despite rather unfavorable atmospheric conditions at the time of the test, the effects of the weedicide on ragweed were apparent up to 100 feet from the machine within 24 hours after treatment.

Summer Flock Management

Condensed from American Poultry Journal

C. E. Rohde

THE months immediately ahead can be the most profitable ones of the year for poultry raisers. In fact analysis of records of poultrymen show that as income goes during the months June through December, so goes total profit for the year. Net returns depend upon the kind of summer management program that keeps the laying flock performing with real efficiency and the young stock growing to vigorous maturity early enough in the fall to "take over" as the older birds go into their seasonal slump.

A steady decline in the percentage of egg production has, through the years, become an accepted occurrence in many flocks when summer weather arrives. Some loss of production from the natural springtime peak is to be expected, but anything less than 50% production is not likely to be profitable. Lower levels of production can be avoided if the management program takes into account a few simple, easy-to-follow principles.

Some hens do not have the inherited ability to lay profitably for long continuous periods of time, so they rest all summer and fall and pull down the daily egg average for the flock to unprofitable levels.

The practice of regular and frequent culling is a phase of summer management that is easy to let slide along. An occasional non-layer may be observed, but at the moment it seems inconvenient to catch her, and perhaps unimportant. Yet it doesn't take many such hens to eliminate profits. It is a generally known and accepted fact that feed accounts for two-thirds of egg production costs. One cull hen eats the profits produced by two good layers, and, as a consequence, 10 such boarders in a flock of 100 birds at any particular time means that 20 additional hens are working to pay this portion of the feed bill, and the flock's profit returning ability is reduced by approximately one-third.

It is a good plan to catch and sell these cull hens as they appear. These "star boarders" are easily identified by their combs that are shriveled and covered with a fine white scale. In contrast, the layers have bright red, smooth, waxy combs. Hens of the yellow skinned varieties that are

Condensed from American Poultry Journal, June, 1946, Chicago, Illinois

laying have bleached or light colored beaks and shanks, while the non-layers have returned this yellow color where it can be first observed in the beak, especially at the corners of the mouth. Those that have been out of production for 3 or more weeks will show about the same amount of yellow beak coloring as they did as pullets before starting to lay.

Many of the most successful poultry raisers catch these culls every few days as they appear, while others follow the practice of culling at least once each month from June through September. The important thing is to stop this profit leak quickly and use these easily observed tell-tale facts as a thoroughly practical substitute for the more complicated culling procedure often described in such detail as to make this simple task seem difficult and confusing.

The disappointment, lack of profit, and perhaps loss involved in low summer egg production can by no means be entirely laid at the door of inherited factors. More often, one or more "leaks" in the management program may aggravate and hasten the decline in production.

In the first place, the birds must be comfortable—comfortable in the sense that their quarters are reasonably cool and well ventilated. They must not be plagued by lice and mites that make daytime feeding activity a restless interlude to the nightmarish experience of heat and fighting the "itch." Under such favorable conditions, egg production and profits diminish rapidly.

Laying houses that may be reasonably comfortable during some seasons of the year can contribute to lowered summer production, unless cross ventilation and some type of roof insulation are provided. Roosts located so as to force the birds to perch close to the ceiling, where the hot, dead air accumulates and may be pocketed, should be avoided.

Lice and especially mites take a heavy toll. They multiply almost as fast as a calculating machine and may build up to seriously damaging numbers before one realizes. For example, at summer temperatures, eggs laid by adult mites hatch in 48 hours, and these newly hatched individuals lay more eggs in less than a week. Frequent examinations of cracks and crevices in the walls of the house, in the nests, and on the roosts is an important detail of summer management. Commercial products are available on the market for use in fighting mites. Be thorough in their application.

Lice, also, multiply rapidly and affect production because of the discomfort they cause. The use of any one of several roost paints

applied to the roosts in a narrow band with a small oil can about an hour before roosting time results in satisfactory control of these pests. They kill the lice during the night, but do not affect the eggs attached to the birds' feathers. For this reason a second application, in exactly 10 days from the first one, is important in order to kill the newly hatched crop before they have matured sufficiently to lay more eggs. Failures or unsatisfactory results with this method of control can generally be attributed to the lack of the 10 day "follow through" treatment, or to birds that may have failed to roost on the perches at the time of the first treatment. Individual treatments with special preparations may also be given if desired.

Chickens have a priority system in their use of feed. Their chief concern in life is survival. Consequently, feed is first used for body maintenance and approximately two-thirds of the total is consumed for this purpose. If the ration is not properly balanced, or if the quantity is limited, egg production will be low because this is the last purpose for which feed is used.

More profitable production can be obtained by confining the flock until noon or mid-afternoon within the laying house close to the kind of feed required to produce eggs. Hens allowed range the entire day seldom consume enough laying mash before departing for their favorite haunts, or in search of insects or other food. In addition hens permitted to shift for themselves seldom consume enough water. Since 2 pounds of water are required for each pound of feed, and maximum consumption of both are necessary for most profitable results, it is only logical to expect and get best results when these essential raw materials are conveniently available.

A hen's appetite is subject to a slump in hot weather. That is why many feed manufacturers have made available a pellet feed for "top feeding" at noonday. A small amount, say 2 to 3 lbs. per 100 birds, is distributed on top of the laying mash as an added incentive to eat.

This practice, or the substitute one of feeding some of the regular mash dampened to a crumbly consistency with water or perhaps milk, aids in maintaining mash consumption.

These "appetite stimulants" should be used at about noon, on regular schedule, and when discontinued, this should be done gradually over a period of one week. Little save additional work is accomplished by this type of feeding early in the morning, because the pellets or crumbly mash merely replace the dry mash that would otherwise be

consumed and no net gain in feed intake is obtained.

More pullets are deprived of their heritage for making profits when they are between the ages of 10 and 24 weeks than at any other time. During this period, they are more likely to be cheated on much needed shade, fresh water, green feed, and grain, as well as growing or developing mash. This is the period, too, when an overdose of parasites, including worms, mites, and lice, reduce the efficiency of feed use and retard growth. The result is a great many poorly developed cull or "border-line" pullets that are ill prepared to take over the duties of heavy laying in September or certainly early October, when one dozen eggs, because of price, yields profits equal to two dozen later in the year.

A brooder house that is as wide open as it is practical to make it does not compare favorably with a summer range shelter for developing pullets.

Plenty of roosting space and space above the birds on the roost away from foul air, is important. Pullets that go to roost panting for breath make poor use of feed.

So much emphasis has been placed on the importance of feeding growing mash to developing pullets that the equally important role of grain is sometimes overlooked. Sturdier and heavier pullets, capable of continuing pullets that the equally important role of grain is sometimes fall and winter production, are obtained by free choice feeding of grain and developing mash. If the grain supply is limited, the pullets will consume larger than necessary quantities of mash and consequently increase production costs.

One hundred pullets actually need a minimum of 10 gals. of water per day. Efficiency of feed use and growth depend upon the availability of this quantity.

It is a good rule to provide at least two 5-ft. feeders and one barrel type fountain for each 100 developing birds.

Best results are obtained when pullets are reared on land that has not been used for this purpose for at least two years. This is one way to avoid serious infestations of round worms, and avoiding a sizable parasitic family of round worms is better than periodic treatments to expel them.

The practices and principles discussed emphasize the fact that nature allots 5 to 6 months in which to build an "egg machine." On the vigor of the bird depend laying results and profits. Summer management should be aimed at building profitable machines for future income and for keeping the productive birds "tuned up" for optimum efficiency.

Dubbing Cockerels Pays Dividends

Condensed from New England Homestead

Roy E. Jones

LAST YEAR, dubbing all breeding cockerels was recommended as a part of Connecticut's Poultry Production Economy Program. The results obtained have been very gratifying and have amply justified general acceptance of this practice.

1. *Rapid Feathering.* Cockerel dubbing should be done when the cockerels are eight weeks old. This allows an opportunity for selection for rapid feathering. Rapid feathering can be identified in day-old chicks by the rapid growth of the flight feathers in comparison with the covert feathers on the wing together with several prominent secondary feathers. Rapid feathering can be identified in chicks ten days old by the pronounced growth of tail feathers. Both of these observations indicate sex link rapid feathering. At eight weeks, sex link rapid feathering may be identified by full tail development, and rapid body feathering may be identified by complete feathering over the back. If a sufficient number of rapid feathering cockerels can be selected, only cockerels carrying this qualification should be dubbed.

If rapid feathering is not sufficiently well established to maintain this standard, only rapid feathering cockerels should be selected to head special breeding pens to produce males for next year's breeding.

2. *Rapid Growth.* The ability to consume a lot of feed and make rapid growth is an important requirement in breeding poultry. This is particularly important in meat production. Rapid growth can be identified by weighing all cockerels at eight weeks using a standard of 2 pounds or more in eight weeks. The higher this standard can be set and still get the number of cockerels required, the better. Some poultrymen working on this program have been able to maintain a cockerel weight standard as high as 2.8 pounds in eight weeks. Select cockerels with rather short legs and full well-fleshed breast rather than the long-legged rangy cockerel that may have made good weight but has undesirable body type.

3. *Identification.* Cockerels selected at eight weeks need some means of identification. Dubbing is an identification mark that can

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never be overlooked. To be effective as an indication of quality, care must be taken not to dub any cockerels that do not have superior rapid feathering and rapid growth qualities at eight weeks.

4. *Less Fighting.* Dubbed cockerels are less troublesome than undubbed cockerels, and they do less fighting as young stock on range and after they are placed in the breeding pens. With the combs and wattles removed, there is less to get hold of and it is not as easy to draw blood. If fighting does occur, cockerels are not as severely damaged and they recover quickly.

5. *Better Livability.* Experience indicates that dubbed cockerels live better than undubbed cockerels. This is the report received from many poultrymen who dubbed cockerels this past year. Dubbed cockerels eat readily from the average mash hopper while undubbed cockerels frequently have difficulty in eating from the mash hopper because of the size of the comb and wattles. Better eating habits apparently make the cockerels disease resistant. Dubbed cockerels never suffer from frosted combs and wattles.

6. *Better Fertility.* Dubbed cockerels remain in better flesh and better health which means higher fertility over a long period of time. With dubbed cockerels there seems to be less "Bossism" and less interference with matings.

How to Dub Cockerels. Cockerels are dubbed by cutting off the comb and wattles with a small but stout pair of shears; metal-cutting shears are excellent. The work can be most easily done by two people — one holding the cockerel by the legs and wings and the other holding the cockerel's head and doing the cutting. Hold the head in a firm erect position and cut the wattles close to the neck as they hang without being touched. If the wattles are pulled out when cut a considerable part of the neck will be left bare. Cut the comb by starting at the rear of the head and cutting toward the front of the comb at the point where the comb widens out above the head.

Cockerel dubbing is a bloody job, but if done on a warm day there will be little or no bleeding. It is surprisnig how quickly combs and wattles will heal and how quickly all evidence of blood will disappear. The best time and place to dub cockerels is out on range. While cockerel dubbing at eight weeks is strongly advised because of the opportunity to check rapid feathering and rate of growth, it is better to dub cockerels at twelve or even sixteen weeks than to allow them to go through a year in the breeding pen without dubbing.

Uniform Sales Ethics

Condensed from Guernsey Breeders' Journal

Karl B. Musser

SOME four years ago, the Pure Bred Dairy Cattle Association, members being the recording societies of the five dairy breeds, accepted the challenge of attempting to secure uniformity in conditions, rules, guaranties and general practices surrounding sales both at public auctions and at private treaty.

Sale titles were becoming a "Hollywood" sort of thing. Dispersals were few in reality, but many in advertisements. In some cases, even the name of sales was an unfair declaration to the public. This matter is now clearly presented in the uniform procedure.

An examination of the *terms and conditions of sale* shows the thought and care that has been taken to be fair to both buyer and seller. There are three masterful words in the section *Bids*. These words are "by-bidding is prohibited." What is "by-bidding?" A complete discussion needs more space than can be taken here but, briefly, any bid given that the person giving it is not prepared to pay or is given without sincerity toward ownership is a "by" or passing bid made only to deceive. Further, when a sale is conducted and owners or consignors are permitted to "start" their animals it is "by-bidding" in the worst form.

A "public" auction should be just that. It is based on the premise that cattle will be sold at a figure determined in free, open, honest, unencumbered and fair procedure to determine the bidder willing to pay the highest figure. Any act impairing such procedure is a violation of good faith. It is theft in the lowest degree and anyone being a party to disturbing free and honest determination of values is unfit to be a breeder of seed stock. So important are the three words, "by-bidding is prohibited," that all breeds have or are preparing by-laws empowering recording societies with full authority to penalize guilty parties.

We heard the other day of a sales organization that considers it to be permissible for a seller at public auction to start his animals at $200 or some other figure. Such a practice should be announced from the auction stand. It should be called a "reserve" bid and when the public is informed that such procedure is being followed,

Reprinted by permission from the Guernsey Breeders' Journal, April 15, 1946, Peterborough, N. H.

there can be no objection, but when it is practiced without announcement, it is plainly "by-bidding" and a sneaking form of chicanery.

When an animal goes into the ring at a *public auction* the seller has surrendered every right of action as designated by the *terms and condition of sale.*

We stress the "by-bidding" phase because "public faith" is an asset no person or group of persons can but cherish.

We are proud that the pure bred dairy cattle breeders are taking so staunch a stand in the matter.

There is some determination among the breeds to devise some terminology that public sales may use to signify that they have pledged to adhere to the uniform procedure and it is hoped that this plan will have early maturity.

In the selling of registered pure bred cattle a complete statement of facts should be made, along with all information available on animals sold. *Sale Title.* This should be a definite statement of dispersal, partial dispersal or consignment, as the case may be, designating any cattle reserved, etc.

(a) Dispersal Sale: Complete sell out, no salable cattle reserved. If a member of a firm or family wishes to purchase any animal to found another herd, this fact should be stated in the catalog and announced by the auctioneer.

(b) Partial Dispersal or Reduction Sale: Selling part of the herd. Explanation must be made.

(c) Consignment Sale: Sale of animals consigned by different breeders. It is recommended that both consignor and breeder be listed on the pedigree of each animal in a consignment sale catalog.

Terms: The terms are cash unless other arrangements are made with the seller before the sale. All payments must be made to the clerk of the sale and no release of animals will be given until satisfactory settlement has been made.

Bids: The highest bidder shall be the buyer. In case of dispute, the animal shall again be put up for advance bids and if there be no advance bid, the animal shall be sold to the person from whom the auctioneer accepted the last bid. Every animal is pledged to absolute sale and by-bidding is prohibited. Every animal must be transferred to a new owner and may not be transferred back to seller in less than a year, except at the discretion of the executive committee of the breed concerned.

Risk: All animals are at purchaser's risk as soon as struck off, but will be cared for free of charge for.....hours.

Errors: If errors are noted in the catalog, announcements will be made from the auction stand and such announcements will

take precedence over the matter in the catalog.

Certificates: Each animal is recorded, or will be recorded, in the Herd Book of the association. Certificates of registry and transfer will be recorded by the seller and furnished the purchaser free of charge.

Shipping: Assistance will be given in loading and shipping animals but no risk is assumed by the sales management or seller. In shipping, animals will be released at the regular railroad appraisal value unless other instructions are given. Hay, bedding and feed placed in cars will be charged for at cost. Crates for shipping by express will be furnished at cost.

Warranties: (1) Each owner warrants clear title to the property and right to sell the same.

(2) Unless otherwise noted in catalog or announced from the auction stand, each animal is sold as sound.

(3) (A) Males are sold as (a) being able to serve after reaching 14 months of age, and (b) having semen after reaching 14 months of age that will have twenty-five per cent of its sperm cells progressively motile after 24 hours of storage at 35 degrees to 50 degrees F. Should any bull not meet these requirements within four months, after 14 months of age, the matter shall be reported in writing to the seller, who shall then have four months to prove the bull's ability to meet these requirements before refunding the purchase price. In no case shall the seller be responsible for more than the sale price of the animal.

(B) Females: Any female pregnant when sold, or that has freshened within 60 days of date of sale, is by that fact proved a breeder. Females bred when sold are presumed to be pregnant to the best of the seller's knowledge and belief. Pregnancy is not thereby guaranteed. Should any female, not pregnant when sold, after reaching the age of 18 months, fail to become pregnant within four months, after being bred to a bull known to be a breeder and after having been treated by a licensed veterinarian, the matter shall be reported in writing to the seller who shall then have the privilege of four months' time, after 18 months of age, in which to prove the animal a breeder before refunding the purchase price. The seller makes no warranties that pregnant cows will deliver calves or that they will carry calves full time. In no case shall the seller be responsible for more than the sale price of the animal.

(4) Above warranties cease when the animal is disposed of by the original purchaser.

(5) Transportation charges on any animals, subject to adjust-

ment, shall be paid by the shipper.

Tuberculin Test and Retest: Each animal has passed a negative test for tuberculosis within 30 days and enters the sale with health certificate approved by state and Federal Government.

Blood Test: All animals have passed a negative test for Bang's disease within 30 days and a complete statement as to the condition of health of the entire herd from which animals originate must be given in the catalog or announced from auction stand. Vaccinated animals and those originating from certified herds shall be so indicated.

Sanitation: To safeguard the health of the cattle, the sales management has thoroughly cleaned and disinfected the barns just prior to this sale.

Probably no general idea has been established well enough to enable new pure bred breeders to establish policies surrounding sales at private treaty.

Misunderstandings are much more frequent in this phase than at public auction. Realizing this, the same procedure was followed in establishing *Sales of Pure Bred Cattle at Private Treaty* that brought about the public auction procedure. Here again the inference is declared in the first paragraph that a pledge has been taken. No forms are signed but one may declare through his letters and advertising that he proposes to follow them wherever adaptable. Repeat orders are what make profitable business and it is to this end that the plan can be used. After some years of general use it is believed that the fundamental statements can have a good influence on adjudicated cases and may eventually become basis for constructing more explicit laws for civil procedure.

The day is not far distant when attention will be given to the matter of "borrowed credit" in pedigree display. Too often material used in extended pedigrees is not to the point of sound selling. Some study will enlighten anyone who knows, but the knowing person needs no protection. It is the new buyer who should be able to read the data in an extended pedigree and realize its value in relation to where it applies for genetics evaluation. "Borrowed Data" is not the type of performance that should be used to sell. If a pedigree is vacant of performance the "Hitchhiking" propaganda "borrowed" from other generations or relatives is oftentimes the unsurmountable hazard in saving a breeding establishment.

Phosphates in Their Working Clothes

Condensed from Eastern States Cooperator

Prof. A. R. Midgely
University of Vermont

THE PRACTICE of using Superphosphate in the gutter with dairy manure has been gaining each year. Superphosphate makes manure a better balanced fertilizer for crop use. In addition, if it is used with fresh manure, superphosphate absorbs ammonia, thus reducing volatilization losses of nitrogen. Recently it has been found that manure in the combination also has a beneficial reciprocal effect by increasing availability of the added phosphate.

The Vermont Experiment Station has done considerable work on the availability of phosphates when added to cattle manure. Comparisons were made to determine the value of using phosphates and manure together or separately from each each other. "Separate" means that the phosphate was mixed directly with the soil, the manure being added later so that there would be a minimum of contact between the phosphate and manure. "Together" means that the phosphate was mixed directly with the manure before it was added to the soil so that there would be a maximum contact between the phosphate and manure.

A very high phosphate fixing soil was used in most of the laboratory and greenhouse experiments because differences in availability are readily seen with such a soil. Field trials were also conducted on several of the more important soil types. Since phosphate availability was the only factor to be measured, it was necessary to eliminate other virtues which the phosphorus and manure might have used in combination such as a reduction in the volatilization losses of nitrogen. Therefore, the manure in all cases was incorporated with the soil as soon as possible after spreading.

Greenhouse Plant Experiments: Most greenhouse pot experiments were conducted on a high phosphate fixing soil. All pots received the same total amount of lime and other materials but the methods of application were different, as shown in the table on page 15. Yields of tomato plants grown in pots on a Podzol B Horizon soil to which different

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phosphates and manure had been added separately or together are shown.

The same amounts of lime, manure, phosphorus, and potash were applied to all pots. Phosphorus was applied at a rate equivalent to 200 pounds of P_2O_5 per acre; potash at a rate equal to that contained in the potassium phosphates.

These results show that all four of the phosphates tested produced considerably greater yields when they were first mixed with the manure. Perhaps this is because cattle manure, which is quite wet, readily absorbs the added phosphorus so that when the mixture is spread on the land, the phosphorus remains with the pieces of manure. This tends to concentrate the mineral into as many pellets as there are manure pieces, and the resulting decreased soil contact reduces fixation.

The above explanation was borne out in another set of experiments in which different sized particles of superphosphate were used separately and together with manure pieces of different sizes. In all instances there was a marked increase in yield when the phosphate was mixed with the manure regardless of whether the phosphate was coarsely or finely ground. However, small pieces of manure or finely ground superphosphate produced poorer yields than the larger particles because pulverized material makes greater contact with the fixing soil. It seems evident, therefore, that it is highly desirable to have the phosphorus concentrated in fairly large pellets if it is not mixed with manure.

Results also show that excessive fixation occurs if the materials are mixed with large amounts of soil. While it may be advantageous to have adequate available phosphorus throughout a large depth of soil, economically this is difficult to achieve on high phosphate-fixing soils. With such soils greater yields were obtained when the same amount of phosphorus was mixed with three rather than six inches of soil.

Greenhouse experiments were also conducted on six different Vermont soil types. Greater yields were again obtained on all soils when superphosphate was mixed with manure and the two applied together rather than when they were applied separately, the greatest increase being on those soils which are known to fix large amounts of phosphorus. Sand and other materials which fix very little phosphorus gave greater yields when the materials were used separately. On soils which are relatively well supplied with phosphorus or which have a low phosphorus fixing capacity, it may be advisable to apply the materials separately in order to

effect a greater distribution within the soil.

Field Experiments: Field trials were conducted with different crops on several soil types. The phosphatic materials were either broadcast separately from manure or applied directly with it by adding them to the manure while it was being loaded. Greater yields were obtained with all three crops when the phosphorus and manure were mixed and applied together rather than applied separately.

Similar results were obtained with alfalfa grown on two different soils during a three-year period. In these experiments the equivalent of 750 pounds of an 0-20-20 fertilizer and 50 pounds of borax per acre were mixed with manure and applied together or they were applied separately. On both the Calais loam and the Berkshire sandy loam soils marked advantages were obtained by using materials as a mixture with manure. Nearly one-half ton more alfalfa hay was obtained each year by following this procedure.

Summary: Field and greenhouse pot experiments show that when superphosphate and manure are mixed and applied together, crop yields are greater than when the materials are applied separately. The manure seems to "protect" the phosphate against excessive fixation in the soil.

Cattle manure is quite wet; thus it readily absorbs the applied phosphate so that when the material is spread on the land, the phosphate goes with the pieces of manure. Thus, the phosphate is concentrated or "pelleted" and its soil contact and exposure to the fixing agents within the soil are greatly reduced. Each piece of phosphated - manure acts as a storehouse or cupboard of well-balanced plant nutrients.

Manure reduces the solubility of superphosphate. This seems to be advantageous because it reduces excessive soil contact.

Active humates may also absorb large amounts of phosphorus and hold it in a replaceable and available form.

The greater the phosphate-fixing capacity of a soil, the more important it becomes to thus reduce excessive soil contact by mixing the phosphate with manure. On the other hand, with low phosphate-fixing soils, it may be advantageous to distribute the phosphate more thoroughly within the soil.

While the practice of adding superphosphate to manure is desirable, yet the value of directly using some phosphatic fertilizer for drilled or rowed crops should not be overlooked. In the latter case, the materials may be concentrated in hills or bands for

immediate plant use. If band placement is used in conjunction with phosphated-manure that has been plowed under, a high plant nutrient availability will remain over a long period of time. While only a limited amount of information is available, results indicate that the efficiency of other materials such as lime, potash and borax will be increased when properly used with manure.

More Milk-Dollars from Cross-Breds

Condensed from **Farm Journal**

John A. Rohlf

IF YOU are a hog raiser, you've known for a long time that you get an extra "kick" when you cross breeds. The animal geneticists call it "hybrid vigor."

More recently we have had experiments that show that crossing beef breeds pays (both two-breed and three-breed crosses).

Latest, and perhaps most important, is the crossing of dairy breeds. The U. S. Department of Agriculture, at its Beltsville Research Center, started cross-breeding seven years ago, and now has enough records to be significant.

The first cross (involving two breeds) stepped up production 30%. Then when these cross-bred heifers were mated to a bull of a third breed, it went up 15% more!

Holsteins, Guernseys, Jerseys and Red Danes were used in various combinations. A few Red Danes had been imported from Denmark in 1935. An old-time favorite and the dominant breed among the dairy-minded Danish people, these animals look much like our Red Polled cattle.

The cows used in the first cross had butterfat records averaging 453 pounds. But when crossed with proved sires, they produced 32 heifers which have made records of 592 pounds of fat—139 pounds more. About a third of this increase could be charged up to the quality of the bulls, but the other two-thirds was evidently due to "hybrid vigor."

In the three-way crosses, these cross-bred heifers were mated to a bull of a third breed. Only six of the resulting heifers have completed their lactations. While this is not enough to allow any final conclusions, it is significant that these six have averaged 653 pounds of fat—61 pounds more than their mothers.

This increase couldn't be charged up to better sires, because the same bulls were used

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throughout the experiment. Again "hybrid vigor" gets credit.

In previous cross-breeding attempts, the cry has been that if you mate Holsteins and Jerseys you get the fat content of the Holstein and the quantity of the Jersey. Although this may be true with random crosses, the Beltsville tests do not confirm this theory. The 13 Holstein-Jersey cross - breds averaged 12,388 pounds milk, 590.6 butterfat, or a fat test of 4.77%.

Cross - breeding should add, rather than detract from the usefulness of registered cattle, for the Beltsville method calls for the use of proved sires of different breeds. Only by using such bulls can high production be maintained and hybrid vigor added.

Dr. M. H. Fohrman, animal geneticist in charge of the cross-breeding experiments, states that cross-breeding should appeal to two groups of dairymen:

First, the man who has spent 10 or 15 years building up a high-producing grade herd. Although he has used pure-bred bulls all the time, he can't register his cows in a breed association. But he can make money — maybe more money—than if he had! If he belongs to an artificial-breeding association it will be easy to mate grades to a proved bull of another breed.

Or there is the dairyman who has the pasture and buildings to handle extra young stock. He may make good money raising cross-bred heifers. Again, artificial insemination will give him a lift. He won't have to keep an extra bull, or any bull, for that matter.

To Prevent Soil from Baking

Condensed from California Cultivator

R. E. Stephenson

"My soil bakes and becomes hard to cultivate" is a frequent complaint, accompanied by the query of how to relieve the situation. Some ask if sand cannot be mixed with the compost soil to loosen it. A few ask about sawdust as a material for loosening the soil. Some think that a chemical such as gypsum might be used.

The answer is that nothing that is practical to do on a large scale can change a heavy clay that bakes hard when dry, so that the soil will become mellow and easy to cultivate. On a small area complete removal of the cultivated depth replacing it with mellow sandy loam might be a last resort. This of course would not be practical on a large scale.

Reprinted by permission from the California Cultivator, Los Angeles, Calif.

A moderate amount of wood ashes or gypsum will help some, but only a little in structure improvement. The most effective treatment is a liberal use of manure, compost, or some organic debris. Soils that are continuously mulched with plant materials such as straw, leaves, or spoiled hay have the best structure.

The granulated, mellow, porous structure under a mulch is in part due to the animal life, particularly earthworms, that are supported by the mulch. In the spring fallen leaves may be observed partially dragged into earthworm burrows. Leaf material and soil pass through the digestive tract of the worm. The worm casts are rather stable pellets that produce the ideal sponge structure. The burrows serve as channels for moisture absorption, drainage and aeration, and for root penetration and development.

Humus formed from partly rotted organic matter serves as binding material to hold the soil in stable granules. If it were possible to get enough humus materials into the soil, there are few conditions that would not be materially improved. A litter mulch constantly maintained provides a high humus content of the top soil. This rotting material is carried several inches into the soil by earthworms and other active soil life.

It is noticeable that soil that is greatly enriched in humus remains in the form of stable granules even after similar soil, long cultivated and depleted of its humus, has run together with more of the appearance of cement than of a mellow seedbed. Anyone who has plowed an old sod has probably noted the gradual loss of structure as the field was cultivated for several years. Or he may have observed the contrast when virgin soil was farmed on one side of the fence, and an old depleted field on the other.

Or it may have been noted that the two fields planted at the same time showed a difference in seed germination. The seed in the soil rich in humus germinated quicker and produced a better stand, partly due perhaps to the mellowing effect of the humus. The better growth following germination was due largely to greater fertility with abundance of humus. Soils rich in humus also supply growth hormones that improve germination and growth. These hormones have been extracted from the soil and were found more abundant in the top soil, and in soils which had received farmyard manure. They may be generated by bacteria that inhabit the soil and that are more abundant where there has been adequate humus renewal.

Dry Milk Has a Future

Condensed from The Nation's Agriculture

Dean R. McCumber

THERE's a silver lining in the reconversion cloud overshadowing the dry milk industry despite the present serious situation resulting from war-end cancellation of military and lend-lease requirements which provided outlets for the biggest dry milk production in the country's history.

"New products using dry milk hold the future of the industry," says S. T. Coulter, of the University of Minnesota dairy department, who is working on many of the problems confronting dry milk.

Increased marketing of whole milk came about because of the government's encouraging farmers to sell whole milk rather than farm-separated cream, by bidding up the price of nonfat dry milk powder. Prices of nonfat milk powder for human food nearly doubled during the period from March, 1941, when the Lend-Lease Act was passed, until October, 1942, when price ceilings were put on manufactured dairy products. In Minnesota, whole milk marketed climbed from 9.2 per cent of all milk produced in the state in 1935 to nearly 30 per cent in 1945.

Marketing whole milk diverted from farm use the skim milk that formerly went to feed pigs, calves and poultry. This made available for human food the very valuable nonfat solids in skimmilk—milk protein, milk sugar, certain minerals and water-soluble vitamins.

To meet lend-lease and armed forces' requirements for dry milk, the government helped finance installation of drying equipment in milk processing plants. Thirty-three central drying plants were equipped in Minnesota alone. Now, with lend-lease and military outlets closed, dairymen are faced with the problem of making a future for dry milk marketing, because it isn't expected that farmers will want to return to selling cream, rather than whole milk.

Dry whole milk will have a prominent place in postwar markets because of the savings it brings about in shipping costs, Coulter says.

"It costs $1.32 to ship a 10-gallon can of milk from Minneapolis to Newark, N. J. It costs

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only 7 cents to ship the solids of this same amount of milk the same distance in the form of dry milk," he points out. "We have learned that by eliminating copper contamination and packing dry whole milk in an inert gas (such as nitrogen) in a sealed can, the product can be kept from developing a 'tallowy' taste for a year or more. More work is needed to prevent the 'stale' flavor which often affects the powder, however."

Dry skim milk production in Minnesota climbed from about 35,000,000 pounds before the war to nearly 200,000,000 pounds last year. Of the 1945 figure, 90 per cent or more was used for human food. Present outlets for nonfat dry milk solids—chiefly in bread—cannot absorb the huge supply. Many people believe it would be unfortunate for skim milk to be held on the farm for livestock and poultry feed, when it is so valuable in human nutrition.

One of the most promising new products is dry ice cream mix. Limited quantities are already on the market in retail packages for home use. The housewife simply adds water, then freezes the mixture to make ice cream. There is a vast potential market for this product at home, especially in sections of the country where milk production is low. The mix requires less refrigeration and has cheaper transportation costs than ice cream. As more deep freeze facilities are installed in homes, demands for mix are expected to grow. Chief bottleneck at present in production of the mix is the scarcity of sugar.

There is also a market abroad for ice cream mix, thanks to G. I. Joe, whose annual quota last year was set at nine gallons (home folks had three gallons), and who, directly or indirectly, has given natives in nearly every quarter of the globe a taste of ice cream. One Minnesota concern already is supplying ice cream mix for foreign consumption.

Dry whey has become more important since new uses of this waste product from cheese have been developed. It contains milk sugar which is used in manufacturing penicillin and, in addition provides a high potency vitamin B complex product.

Coulter believes a dry cream will be developed. "The problem of preparing dried cream that will not oxidize has retarded manufacture of this product, but eventually hospitals, institutions, restaurants, hotels and homes will be supplied with a dry cream that can be reconstituted readily. Much research now underway with dry whole milk and dry ice cream mix will be applied later in producing dry cream. Dry butter is not beyond the realm of possibility, either. Visualize a product to which you add water,

stir and chill to produce butter. No such product is on the market today, but research men and processors are interested."

Butter oil, which is concentrated and can be quickly made into normal table butter by the addition of water and chilling, is being prepared in New Zealand and Australia on a large scale. Some American dairy interests are following the progress of this product with the idea of introducing it in this country. Plastic cream, which is simply highly concentrated cream (75 to 80 per cent of milk fat), has been manufactured in Minnesota for over 15 years but its possible uses have not by any means been exhausted. At present it is used in cooking, manufacturing ice cream, preparing cream cheese and standardizing market milk. There are many other miscellaneous uses for dry milk products, including pie mixes and puddings — vanilla, chocolate and butterscotch.

Sex Your Chicks at a Glance

Condensed from Farm and Ranch

Lorenz A. Bailey

AUTO-SEXING chicks, the kind having down which enables one to tell the males from females by color and by feather pattern at sight, are here.

R. George Jaap, poultry professor and geneticist with the Oklahoma Agricultural Experiment Station at Stillwater, and his associates have been doing extensive work in developing such chickens. In the process, they have developed a new breed which promises to be an ideal dual-purpose bird for the Southwest area. The two varieties of this new breed are the Gold Oklabar and the Silver Oklabar.

Self-sexing chicks are always named as — *bar,* hence *Okla* (Oklahoma, place of origin) *bar.*

"The main purpose of starting the breeding work which led to the development of the Oklabar," Dr. Jaap admitted, "was to show the practicality of color (automatic) sexing and to determine if 100% color-sexing accuracy could be attained."

At present there is no breed available in which are found the qualities of automatic sexing, rapid feathering, rapid growth, high egg production and the meat quality found on broad breasted type birds. The new breed, Jaap hopes, will combine all of these qualities.

In developing the Oklabar, the first cross, which was made in 1936, consisted of White Plymouth Rocks and Rhode Island Reds. The reason for using that strain of White Plymouth Rocks was that it contained, even though hidden by absence of color in the feathers, striped down color and barring inheritance characteristics.

Striped down color and white bars on the feathers were secured in the first cross, so a male of this generation was mated to selected Rhode Island Red females. By careful testing and selective recrossing, the recessive color was eliminated from later progeny. Chicks were finally hatched having blotchy, light-colored down in the male and striped female chicks. Mating of such marked males to females produced the auto-sexing accuracy at a glance.

Addition of meat quality was attained by crossing such chicks with a particularly desirable

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strain of Dark Cornish, which also had the quality of early feathering.

Although such infusion of new blood destroyed the auto-sexing factor for a few generations, it has been brought out again by careful selection and mating, and the present true-breeding Gold Oklabar is the result.

The Silver Oklabar was evolved by the infusion of silver from the Silver-laced Wyandotte. The procedure for developing such a bird is similar to that described in the case of the Gold variety. Both varieties breed true in color and color pattern. The Gold Oklabar has a pea comb, while the Silver strain has the single type with blade and points.

The Southwest area favors white-feathered chickens for meat purposes, Jaap believes, and the Silver Oklabar will be so nearly white, in addition to having the desirable broad breast, the ability to grow rapidly, and a reasonably high egg production, that it will make a highly desirable all-purpose bird.

"The color-sexing method is easier, more accurate, and less expensive than the cloacal method," Dr. Jaap maintains, "and if a breed has other desirable characteristics, it may prove to be the deciding factor."

Both the Gold and Silver Oklabars will have been proven to be reliably true breeding before they are released to the public. "It is possible, even likely, that they may be proven and developed to the point that the general public may try them in another two years," Jaap says.

The experiment station has, at present, three pens of each pedigreed variety, each pen consisting of a cock and twelve to fifteen females. In addition, there is a large flock of pedigreed pullets now undergoing egg production tests.

Extensive experimentation work in developing new strains of standard varieties of well-known breeds is also being carried on by Jaap and his associates. These breeds include: Barred Plymouth Rocks and White Wyandottes having 100% early feathering; White Plymouth Rocks showing 100% early feathering heredity; a strain of Rhode Island Reds being bred for color sexing and a strain of New Hampshires, which have an outstanding rate of growth.

Advantages of early feathering, Dr. Jaap pointed out, are: elimination of "bare-backed" broilers (causing loss of market quality), less danger of feather picking and cannibalism, and reduced fuel bills, as feathers permit a shorter period for heating brooders.

Earthworms Fight Erosion

Condensed from Soil Conservation

Henry Hopp

Soil Conservation Service

THE lowly earthworm's part in conserving soil is being studied by research workers of the Soil Conservation Service.

Soils experts have long known that the formation of granules helps to make the soil resistant to erosion. These granules are known technically as soil aggregates. Aggregates consist of individual soil particles cemented together into larger pellets.

The individual particles of a soil are classified as gravel, sand, silt, and clay. Gravel is made up of particles larger than approximately $^1/_{25}$ of an inch. Sand particles range from $^1/_{25}$ of an inch down to $^1/_{500}$ of an inch. Silt particles measure between $^1/_{500}$ and $^1/_{12500}$ of an inch. Particles smaller than $^1/_{12500}$ of an inch classify as clay.

In an unaggregated soil the particles are separate. When exposed to the erosive action of rain and flowing water, many tiny particles are carried away and the rest are packed together. Soil in this condition becomes waterlogged with rain; crusted and hard with drought. When a soil becomes aggregated, the individual particles — usually the smaller ones—join together into larger compact granules. These granules may vary in size up to ¼ of an inch thick. They resist better the beating action of rain, and because they are not carried so easily by flowing water make the soil more resistant to erosion. Well aggregated soil keeps its looseness when dry or wet. Water goes in easily and the soil remains ventilated. This good balance between air and water in the soils helps plants to grow. The formation of aggregates, therefore, becomes a matter of prime importance to soil conservation.

We know that microscopic soil organisms have a part in forming aggregates. The bacteria and molds of the soil live on dead vegetation or the trash left after crops are removed. Certain of the bacteria are known to produce slimy materials capable of cementing individual particles together. Molds consist of fine threads which may serve similarly.

Now, data from the new pro-

Reprinted from Soil Conservation, May, 1946, Washington, D. C.

ject seem to show that earthworms are topnotch builders of aggregates

In one test, soil from a lespedeza field was first screened. The screen had holes $^1/_{50}$ of an inch in diameter. This fine soil was placed in containers and water was added. One container held the soil plus whatever bacteria and molds were naturally present. The contents of the other container were similar except that the worms were added.

After 3 days, water-stable aggregates had been formed that would no longer pass through the screen. In the soil containing micro-organisms but no worms, 5.9 percent of the soil had formed these large aggregates. In the soil containing worms, 12 per cent was in large aggregates. Thus, the soil containing worms had about double the quantity of water-stable aggregates.

Not only was the *proportion* of aggregates larger with worms present, but the *durability* of these aggregates when hit by raindrops was greater. This was determined by subjecting the larger aggregates to water dropped from a height of twelve inches. The number of drops required to break the aggregates into finer particles was counted. The aggregates formed under the action of micro-organisms alone were broken apart by 6 drops, those from the worm cultures by an average of 13 drops. The worm-culture aggregates were, therefore, about twice as resistant to the erosive action of falling water.

How do earthworms form these aggregates? Worms are unique in that they are among the few animals that eat soil. They eat the soil along with organic matter. The excrement—or worm manure — is expelled as tiny pellets. These are the earthworm aggregates.

The rate at which earthworms excrete aggregates was determined in other tests. Three different kinds of earthworms were used: *Lumbricus terrestris*, which was obtained from a lespedeza field; *Helodrilus caliginosus* from a broomsedge field; and *Helodrilus foetidus* from a manure pile. They were given good moisture conditions, a fertile soil, and warm temperature. The *Lumbricus* worms, the largest of the three species, produced about their own weight of aggregates per day. The two other species, which were smaller, produced aggregates at a slower rate. The size and shape of the aggregates varied with the kind and size of the worms, the *Lubricus* worms averaging largest. It looks from these studies as if earthworms are pretty good aggregate factories.

To what extent can farmers increase earthworms in the soil by simple methods? Results from

rotation plots started 5 years ago at the Maryland Agricultural Experiment Station offer some light on this question. One set of counts was made on land cropped the following ways:

(*a*) Row cropping every year.

(*b*) Two-year rotation (row crop the first season, small grain and sod crop the second season).

(*c*) Three-year rotation (row crop the first season, small grain the second season, hay crop the third season).

The earthworms were counted during the winter on the plots that had been in row crop the previous season. About five times as many worms were present in the 3-year rotation plots as in those subject to annual cultivation.

Cover	Strip Number	Earthworms Per Acre (thousands)
Sericea	1	1,100
	3	825
	5	910
	7	1,010
	9	1,830
Average		1,136
Broomsedge	2	320
	4	550
	6	550
	8	640
Average		515

Another set of comparisons suggests that farmers may be able to keep up the worm population even with an annual cropping system. The test included:

(*a*) Row crops, in which the land is plowed and cultivated.

(*b*) Drilled soybeans, in which the land is prepared by disking and no summer cultivation is given.

(*c*) Drilled winter grain, in which the land is prepared in the fall, and left idle after grain harvest in the spring.

(*d*) Drilled winter grain, in which the land is prepared in the fall, but a summer legume is seeded into the grain or after the grain is harvested in the spring.

The results for these counts revealed that the plots in the winter grain-summer legume cropping plan contained far the most worms, about 10 times as many as in the plots planted annually to row crops. Indeed, the worms in the winter grain-summer legume plots were almost as numerous as in legume sod plots. Good conservation use of the land and increased earthworm population would seem to go together.

A third study made by the earthworm project suggests the importance of growing legumes. An old broomsedge field on the Soil Conservation Service tract of the Agricultrural Research Center at Beltsville, Md., had been partially converted to sericea lespedeza some 7 years ago. Five narrow strips, each 13 feet wide, were disked and seeded to sericea at that time, with intervening strips of the same width

left in broomsedge. Earthworm counts made in early March of 1946 gave the results shown in table 2. More than 1 million earthworms per acre were found in the sericea strips, whereas, only half this number occurred in the broomsedge.

This project bids fair to add a new wrinkle to soil conservation.

The studies indicate that an earthworm may produce, under good conditions, about 1 gram or thereabouts of aggregates per day. Worm populations of the size found in this study would be capable of aggregating perhaps 500 pounds or more per acre per day. So you see that the earthworm may be a real workhorse when it comes to turning out the aggregates we want for soil conservation. The earthworm project is beginning to show that you can keep this workhorse busy and still use your land.

Fewer Flies, More Beef

A whole neighborhood of ranchers in Southwest Oklahoma is using DDT to produce more beef. An ambitious gang of Future Farmers from the Carnegie Chapter showed 'em how, and no one is happier about it than the "old dogs who have learned the new trick."

Just before the end of the war the state FFA organization bought a motor-driven orchard spray to lend to various chapters for DDT demonstrations. When the sprayer arrived in Carnegie the FFA boys took it out to nearby ranches, sprayed whole herds in an afternoon. The treatment didn't cost much (about 1⅓ cents a head) and it killed the flies. The ranchers liked the idea, so did the FFA boys. So about a dozen ranchers and the FFA chapter chipped in and bought a sprayer.

The idea caught on, other "pools" were formed, and there are now nine sprayers in the Carnegie area. This last winter they used the sprayers for killing grubs, putting some rotenone and wet sulfur with DDT.

Charles Hogan, Carnegie voag teacher, figures the spraying (once every three weeks) is worth 100 pounds of beef per cow and calf during the summer. Ranchers think this is conservative. They claim twice that much, or "a pound a day for every animal during fly-time, because they eat instead of fighting flies."

—Farm Journal

A Bow to Brome

Condensed from Nebraska Farmer

Wilkie Collins, Jr.

SMOOTH brome is truly a farmer-stockman's grass. And is a panacea for a great number of agricultural headaches.

Bromegrass' ever-increasing popularity is giving it an important place in meeting the nation's annual 160 million pound seed requirement. According to F. D. Keim, chairman of the University of Nebraska department of agronomy, there will be a million acres of bromegrass in Nebraska by 1950.

The phenomenal increase of bromegrass acreage is due to its value as livestock feed, for conservation purposes and for seed. Its large quantity of tough fibrous roots make it an excellent sod binder which can stand considerable abuse as well as silting and flooding.

Bromegrass is being used as a soil conserving measure in rotations, for planting on steep cultivated slopes and in field draws. It is used for buffer strips, for sod plumes and terrace outlets, for headlands around the fields, and for roadside plantings.

As a cash crop from Canada through the eastern parts of South Dakota, Nebraska, and Kansas on dry-farmed land, and farther west on irrigated land, bromegrass bows its head to no other grass. And, according to many farmers and stockman, to no other crop. As an increaser of livestock production, a reducer of winter feed needs, and as a protective land cover for erosion control, it is unexcelled. The cash return from the seed alone makes many a crop take a 5th row gallery seat.

Once introduced in a community, bromegrass acreage can grow in leaps and bounds. In Pawnee county no bromegrass was being grown in 1935, according to D. E. Hutchinson, Nebraska Extension Soil Conservationist. Now, more than 1,000 of the 1,300 farmers in the county are producing this hardy, long-lived perennial which provides excellent spring, early summer, and late fall pasture, as well as a high quality hay which, if harvested at the proper time, is nearly equal in protein content to alfalfa. And in Gage county alone there were over 31,000 acres of bromegrass in 1944.

Typical of the many exper-

Reprinted by permission from the Nebraska Farmer, June 1, 1946

iences farmers have had with bromegrass is the one related by Reverend Peter C. Krey. Cooperating with the Cass County Soil Conservation District, Reverend Krey had 180 acres of bromegrass in various combinations with alfalfa, sweet clover, and red clover. In 1943 he grazed 100 steers on this grass. In 1944, he harvested 42,000 pounds of seed, and from August on, pastured 135 head of cattle on the acreage and had feed to spare. The income that year from the 237-acre farm on which no grain was grown was $6,500.

One of the oldest stands of bromegrass in the Northern Great Plains is on the J. B. Ryan farm, Holt county. The first bromegrass was planted on this unit in about 1900, 18 years after its introduction into the United States. Seeded by Michael Holland, owner of the unit at that time, the original plot has furnished seed for all subsequent plantings. In the spring of 1944, Ryan harvested 32,000 pounds of seed from 150 acres.

From the waterways and turnrows alone, Vernon Cates, near Lyons, a cooperator with the Burt County Soil Conservation District, harvested 1,500 pounds of seed. Bromegrass seeded five years ago on bindweed infested land on which sweet clover volunteered provided excellent pasture and held the bindweed under control, is the report of James Wardell, near Arlington.

As bromegrass in many cases becomes sod-bound after a few years' growth, farmers are seeding it in mixture with alfalfa.

According to R. L. Throckmorton, Kansas State College, bromegrass needs nitrogen to yield appreciable amounts of seed. By adding nitrogen fertilizer and when there is ample moisture, bromegrass seed yields have increased considerably, and have more than doubled. He cites the effects of the application of ammonium sulfate in increasing yields.

The Michigan Experiment Station produced 326 pounds of bromegrass seed to the acre through the application of 400 pounds of ammonium sulfate. Only 90 pounds of seed were harvested when no nitrogen was introduced. The University of Nebraska results show that superphosphate has no beneficial effect on seed yields when applied to bromegrass. However, application of ammonium sulfate increased yields 100 to 300 pounds per acre.

Soil Conservation Service technicians have been careful when assisting soil conservation district cooperators, to explain the value of introducing a leguminous crop with brome grass to prevent sod-binding and low production. Some farmers are remedying this condition by spreading

barnyard manure, and more recently by applying the ammonium nitrate.

Recent tests by the Soil Conservation Service show that early spring application of nitrogen fertilizer is a very simple method of increasing seed yields. One Service employee who owns a farm in eastern Nebraska applied uramon, a fertilizer of high nitrogen content, on part of his bromegrass. Where applied he harvested 500 pounds of seed to the acre. Where not applied, no seed was produced.

Ten different soil conservation districts in northeastern Nebraska are carrying on fertilizer demonstrations on bromegrass land. Ammonium nitrate was applied at the rate of 200 pounds per acre in late March and early April. The nitrate was applied by the solution method. The results will show the effects of the nitrate on the old stands of bromegrass.

Problems connected with seeding and growing bromegrass are few. The purpose of the demonstrations is to verify what has already been pretty well determined about the nitrogen needs of the crop.

To farmers throughout its area of adaptability, bromegrass is truly a farmer-stockman's grass. In the stretch of its race, bromegrass is passing virtually all other grasses qualified to run. It looks like a sure winner, a sure producer.

Does It Pay to Shear Feeding Lambs?

Condensed from Iowa Farm Economist

C. C. Culbertson

IT DID not pay to shear feeding lambs in the tests we made during the best feeding season at the Iowa Station.

In this test we had two lots of 50 lambs each with wool on and two lots shorn that were fed and handled exactly alike. The lambs that had been shorn ate more corn and alfalfa hay but didn't gain any faster than those with wool on.

The lambs fed were "prairie" lambs—not mountain—from the West. They weighed an average of 74 pounds each when started on feed Oct. 9. The two lots were shorn Oct. 11.

Weather in October last year was quite warm, and the shorn lambs gained faster than those with wool on the first month. The weather turned cold and the lambs with wool on caught up.

For the whole feeding period of 120 days, it took more corn and hay to make about the same gains on the shorn lambs as on those with wool on. It is possible that had the lambs been started on feed in late August or September with more warm weather, the shorn lambs might have been ahead. We are planning to make another test to find whether shearing might pay if feeding begins earlier.

The fleeces from the lambs shorn last fall averaged 3.23 pounds each. At 40 cents a pound, the gross income from the wool was $1.29 per lamb. It cost 30 cents a head to get them sheared, so the net income from the wool was 99 cents per lamb.

The shorn lambs sold for about 50 cents per hundred less than the lambs with wool on. The sale was on a graded basis. The margin per lamb over feed cost was 15 cents on one of the lots with wool and a loss of 6 cents on the other lot. The two shorn lots showed a loss of 53 and 80 cents to the lamb.

The net income from the wool was not enough on the shorn lot to offset the poorer margin per lamb. It was not profitable to shear in these tests.

In the previous year we had compared lots of lambs fed to the extent of their appetite with lots that were brought up to a good feed with the intention of holding them at the corn level. It

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didn't work well a year ago and we wanted to try it again this past year.

Two lots this past season were brought up to 1½ pounds corn per lamb daily, and we tried to hold them at that level. But they started going off feed and we lost some. They couldn't take corn at that level.

We had to bring these lambs down to a corn ration comparable to that fed the lambs which were fed all they would clean up. The gains of the lambs started out on this limited corn ration and those on full feed were practically the same.

We have concluded from the two years of feeding trials that if you are going to fix a limit to the corn, that limit must be below full-feed. In both years when we brought the lambs up to what might be considered a good full-feed and tried holding them at that level, the lambs began going off feed.

All of the lambs in this past year's feeding trials ate an average of about 1.2 pounds corn daily. A year ago the lambs ate more—1.3 pounds each daily. So it took 120 days in 1945-46 to put on the same finish as the lambs obtained in 90 days the year before.

Ask the Trees!

Condensed from American Fruit Grower

M. A. Blake

New Jersey Experiment Station

It is the ambition and the goal of every commercial apple grower to produce fruit that will be exceptionally high in size, color, and market and edible qualities. It is fruit that will grade a bit better than U. S. No. 1 that "tops the market" and appeals to the buyers who seek fruit that is a bit above average.

The factors which result in the development of the best grade and quality of apples are still not as generally known and understood as they should be.

The facts are, that the combined effect of such basic factors as air, light, moisture, temperature, and nutrients really determines the character of any crop of apples. If any one of these is deficient or unfavorable in a given season, the ideal crop of apples will not materialize. The contention may be raised that the grower has no control over and cannot influence air, light, moisture, or temperature.

The Delicious apple will not develop fruits of the desired size, color, and quality in New Jersey if planted on a too dense soil because of a lack of sufficient aeration. If trees of the same variety are planted too close together so that little side light is available, or if the site is subject to too much shade, humidity, smoke, fog, or cloudiness, the fruit color will not be high. Lack of sufficient moisture means small apples and a dull "finish." Too much moisture means limited crops of fruit of inferior texture, color, and flavor. When selecting a site for an orchard the grower has an opportunity to choose a location with favorable moisture conditions. The amount of moisture available to the trees can also be influenced by distance of planting of the trees and by soil improvement and management practices.

Too high temperatures can alone result in apples of poor color, texture, and quality. If the daily mean temperatures are as high as 70° F. during the last two to three weeks of the ripening season of McIntosh, the fruit will be lacking in red color, firmness and keeping qualities. No matter what fertilization practice is fol-

Reprinted by permission from the American Fruit Grower, June, 1946

lowed it will not offset a too warm location. The temperature of the soil can be modified at least five degrees by such a practice as mulching.

Every plant authority will agree that all plants, including apple trees, require all of the common nutrients including calcium, nitrogen, phosphorus, potash, and the minor elements. The difference of opinion arises as to how much the qualities available in the soil must be supplemented to meet the needs of any given orchard.

Trees must have favorable amounts of air, light, heat, moisture, and nutrients in order to develop thick leathery leaves to manufacture starches and sugars or carbohydrates. Apple growers are beginning to realize more and more that apple trees cannot produce good apples without leaves. Serious spray injuries to leaves have been a costly teacher.

Trees cannot grow without the carbohydrates which they themselves manufacture. Young apple trees may be vigorous and healthy but for a number of years commonly produce no fruit because the carbohydrates are utilized largely for vegetative extension of branches and roots and for general maintenance. It is an old saying that to obtain fruit, one must have a proper balance between vegetative growth and fruit production. In other words, the tree must be vigorous but unless there is a reserve of carbohydrates in the tree over that used for vegetative growth, there will not be any fruit buds formed. It requires more carbohydrates to support the setting of fruit than for the formation of fruit buds and even more to develop a crop of fruit.

A tree may actually be unfruitful if it is undervegetative or lacking in vigor, and may be equally unfruitful if too overvegetative. Even if such extremes do not prevail, trees may bear fairly well but the fruit lacks size or color because of a certain degree of an under or overvegetative condition. How is a grower to know when his treees are making a favorable amount of growth and of the right composition or quality?

The best source of information is the tree itself. The growth condition or status of every tree is the result of the combined effect of all the factors which influence growth. The tree indicates what has been and is taking place within the plant by means of its leaves, buds, flowers, and fruits. If one can but read these signs he can gain an intimate knowledge of the general growth status of a tree.

The Delicious apple was observed to be one of the most sensitive to growth factors of any variety grown in New Jersey and

a special study was made of its leaf and bud character signs. It was learned that the size of the leaves upon a spur was a dependable measure of its vigor while the form of the leaves was a good indicator of its composition.

Four classes of spurs based on leaf size were set up as summer standards for New Jersey conditions in 1934. A winter standard was correlated with the summer standard on the basis of bud size. Given favorable conditions, No. 1 and 2 spurs in summer will develop into No. 1 and 2 dormant season spurs. A large percentage of these will bloom the following season, set, and develop fruits. A No. 3 spur in summer will generally become a No. 3 dormant season spur. Some of these will bloom and set fruit under New Jersey conditions but most of the fruits will drop by midsummer. A few No. 4 spurs may bloom but will seldom set any fruit. Thus by reading the spur signs, which the trees themselves provide, fairly accurate "fortune telling" is possible months in advance of a crop season.

It is quite possible that some modifications of these standards may be necessary for other regions.

The length and diameter of the annual growth at the tips of branches is also a valuable supplement to the spur, leaf and bud signs of tree composition. This, however, would require too much space for discussion here.

Apple trees indicate by the character sign language whether or not they have experienced deficiencies of moisture or of the various nutrients. It was only possible in this article to give an example of spur indicators of growth status or fruitfulness and vigor. The object was to emphasize the opportunities and advantages to be gained from a study of the character sign language offered by apple trees.

What Constitutes Nicking

Condensed from The Shorthorn World

Prof. L. M. Winters
University of Minnesota

THE TERM nicking is an old one, but it is still used very generally. The term arose through the observation that certain matings were more successful than others. A certain bull when mated to a certain cow or cows sired especially superior calves but when mated to other cows sired very ordinary calves. Certain families within the breed appeared to cross to better advantage than other families and some breeds gave evidence of crossing to better advantage than other breeds. Thus the term nick came into being to describe these more fortunate matings.

Nicking has a great deal of practical significance to the breeder; if the new herd bull mates well with the female herd, a crop of calves with high market value results, but if he mates poorly the calves have low sale value. Nicking is not a myth, it is real and it means dollars and cents to the breeder. On the other hand, one may use his imagination and make himself believe a sire is doing more or less for the herd than he actually is doing. We all have imaginations, we need imagination to do constructive breeding, but we must hold it in check when we come to appraising our animals' breeding worth.

Since nicking is of practical importance it has been a popular subject for speculation, both as to cause and effect. I have heard many express the belief that success in breeding was dependent on continuing to uncover successful nicks. We have all heard many who could tell in advance how successfully this cow and bull would mate. We will say more of this later.

Let us now carefully examine what really constitutes nicking. It has been written many times that the new individual starts life from the union of two tiny germ cells; one from the sire and one from the dam. Within these germ cells are chromosomes and on the chromosomes are genes. The genes are actually something that make it possible for you to develop a grand champion or to develop just another Shorthorn. These genes then occur in pairs,

Reprinted by permission from The Shorthorn World, May 10, 1946, Aurora, Illinois

one of each pair came from the sire and one from the dam. There are hundreds, more likely thousands, of these pairs. In rare instances a character may be the expression of a single pair. In most instances, characters are the expressions of many pairs. It now so happens that the various genes work together with different end results. In other words it is something like making up a good working ball team. One group of nine men play ball together as a team and just click. Then for some reason we replace, let us say, the catcher and the shortstop with two men equally good, but who for some reason fail to fit in with the team, then our ball team is no longer a clicking outfit. That is much the way it is with the genes. Some genes supply what others lack and some genes just gang up together to make things go while others produce very ordinary results. A successful nick therefore is dependent on a successful working combination of genes.

One of the most important factors in obtaining a successful working combination of genes is to have a maximum of the hybrid state—the cross-bred condition. No, we are not talking now of crossing breeds but of having a maximum of differences between the gene pair members. This I know sounds confusing but let's not let it worry us; it so happens the genes occur in pairs and the members of a pair are alike or they are not alike. When they are alike purity of germ plasm is promoted. When they are not alike the hybrid state is promoted. It's not a case of one being bad and the other good. Both are good in the right place and both are bad in the wrong place. In other words in constructive breeding there is a place—a need—for both.

Every mating has in it the elements of both pure breeding and crossbreeding. In every mating some genes are paired that are alike and others are paired that are unlike. When we mate within a breed more similar genes are paired than when we cross breed boundaries. When we mate within a breed-family more similar genes are paired than when we make wide matings within the breed. And when we mate close relatives still more similar genes are paired. The closer the mating the more similar genes are paired and the wider the mating the more unlike genes are paired. Now to return to nicking, the pairing of unlike genes promotes what is known as hybrid vigor (that is the stuff you get in hybrid corn) and this in turn can give us a successful nick.

A breeder wants a bull that will nick with his cow herd. What are we to tell him about what bull to select? If we are smart and

have a reputation to maintain we won't tell him, because there is no way of knowing except by the breeding test; unless the cows belong to a certain definite family and we actually know this family crosses well with another definite family. Unfortunately very few of our livestock families are definite family groups.

But we will assume we have a successful nick and now are in need of another bull to get another successful nick. All I can tell the breeder is, "Pick a good bull and hope." The breeding test is the only way we can tell how they will mate. This spoils lots of fun in having all the answers in advance but it is the truth unless we are dealing with very definite family groups.

A number of years ago when I was both younger and more gullible, I was associated with a university that had acquired the best group of Clydesdale horses ever assembled in America. One day it was my pleasure to show them to some of the breed's best authorities. During the visit they discussed how the matings should be made for best results. I was "all ears" because at last I had a chance to learn at the fountain of knowledge. It so happened that most of the matings they recommended were made, but the result was plow horses, not champions. On the other hand, many of the matings they said shouldn't be made did produce blue and purple ribbon winners.

We must realize this was an unusual case because they should have come close to being right in fifty per cent of the cases. It hurts our vanity, but we may as well face the truth, we can't tell without trying. Corn breeders have had much more experience with this sort of thing than any of us in the animal field and they can't tell how two different inbred lines will cross until after they have made the cross.

This then brings us to the point: Nicking is real and we can explain nicking on a scientific basis. We can kid ourselves a lot, but the truth is none of us can tell by looking at animals how they will nick. Nicking like many other tools is a double edged sword; it can be used for constructive purposes, and on the other hand it can be used destructively.

A nick can be used constructively in two ways. One way is by attempting to fix the desirable type that has been achieved through the successful nick. The only way of doing this is by inbreeding accompanied by very careful selection toward the given ideal. The inbreeding must be continuous to be successful in fixing type. It is far more important that the inbreeding be continuous than that it be especially close, such as sire-daughter. A

point that is well to keep in mind is, if we inbreed for several generations and then introduce an outcross we have, by that outcross, destroyed all the purity we achieved through years of constructive breeding.

The second way in which nicking can be used constructively is as the corn breeders use it and as we see signs of using it soon in swine and poultry breeding. This is where definite families have been developed and certain of these families have been found to nick to advantage. Once it has been proved that two or three families nick to advantage the nicking can be produced at will. It is true some breeders in the past set their goals on following through on the continuous nicking of two families. In many instances the breeders were disappointed after several years. The reason for the disappointment was not that the system failed but they were dealing with families that were familiar more in name than in fact.

For a group of individuals to constitute a true family, the members must possess a high degree of relationship, the mere possession of a family name is not enough. In order that nicking be called out at will we must first develop definite families, then we must find the combinations that nick successfully. After that it becomes necessary that the families be maintained as such in order that we can draw on them at will for further crossing.

The statement was made above that nicking might be used destructively as well as constructively. A continuous hunt for nicks is bound eventually to end in disaster. The reason for that goes back again to the genes. We will assume that we have an animal that is pure for a number of pairs of genes, but we will in this case take only one pair and represent them by AA. We mate the animal to another that differs as regards this pair of genes (and several others). The result is the offspring has genes AA^1. Now we hunt for another outcross and we find one with the genes A^2A^2. When we mate this latter to our AA^1 either the A or the A^1 has to go out. Now we have lost what we built up in our first nick. This latter illustration is a simplification of what actually takes place, for in fact many pairs of genes are involved and their interplay is involved, but we can pass by those details.

When one reviews livestock history carefully one can find many apparent evidences as to where the old breeders used nicks very successfully and toward constructive ends. In many instances rather wide crosses were made with success and they were followed by inbreeding accompanied by very careful selection. It sim-

ply comes down to this, there is a place for the outcross, and at times for a very wide one, and there also is a place for staying within the family circle.

If the herd or family, with which we are concerned is lacking in something then the quickest and most certain method of getting this something is by going where it is most abundant. When we do this we are going out for genes. Unfortunately we cannot see the genes, as we might distinguish white kernels from yellow ones. We must hunt for them through their expression of a straight top or whatever it is we need. When we do this by individuals unfortunately we do not know whether the animal possesses the trait as the result of purity or whether it is the result of a successful nick by its parents. If it is the result of a successful nick then this animal's record when he becomes a breeder may be expected to be a hit and miss affair.

Nicking is a fascinating subject, it offers the breeder great hope and often disappointment, especially after he has produced an outstanding individual through a nick and then the individual fails as a sire. By understanding what is involved, we at least can reduce our disappointments. Further than that we can use nicking for constructive ends, but to do this we must use both the principle of crossbreeding and that of inbreeding, for nicking involves crossbreeding and inbreeding must be called into play to hold what we have achieved.

Let it please thee to keep in order a moderate-sized farm, that so thy garners may be full of fruits in their season.

—*Hesiod, 7th Century B.C.*

He Turns His Hens Into Meat

Condensed from New Jersey Farm and Garden

Sam H. Reck

SOMEWHAT unusual—but profitable — is the plan which R. V. Page, of Toms River, New Jersey, follows on his farm.

He gets his chicks early, all heavies, pushes them along so they start laying in July and sells them off in February and March.

Ten years of experience with this method of handling his enterprise have convinced him that the advantages far outweigh the disadvantages.

He starts the lights in the laying house right after Labor Day —four to six weeks earlier than most poultry farmers — and by Thanksgiving time when prices are strong his hens are laying 100 per cent "extras."

Comes February and March, the hens have laid a half case of eggs apiece, and production is going downhill. The eggs are getting thin-shelled and prices are on the toboggan. By that time the hens have paid for themselves with the eggs they have produced, and Mr. Page figures on getting his annual profit by cashing them for meat. During the last 10 years his Red-Rock crosses have brought an average of about 25 cents per pound or $1.75 per bird.

Bulking large in the list of advantages of this system is disease control. "We've never had to vaccinate for laryngotracheitis," Mr. Page declared, "and we've had no trouble with coryza, which is a problem on 75 per cent of the poultry farms in this area."

As a general rule he starts 18,000 sex-linked pullets of which he puts 7,500 into his laying houses. About 5,000 are sold as ready-to-lay pullets and the balance are sold for meat. Mr. Page averages 66 per cent production from his birds and his mortality losses are low — about one per cent per month. At the end of the season he culls about three per cent of the hens as being unfit for meat purposes, but the rest usually return a very satisfactory profit for the year's business.

A strong believer in soil conservation, Mr. Page has managed the 30 cultivated acres on his 145-acre farm so that soil losses are kept at a minimum. Two terraces —2,900 feet—help keep rains from washing down sloping fields. Mr. Page has also done an outstanding job of utilizing good grass range in growing his young stock. Eleven acres of Ladino clover were seeded last fall.

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Measures for the New Hog

Condensed from Capper's Farmer

Hadley Read

A NEW TYPE of hog is developing. It is a product of consumer demand for more lean meat and less fat. Another influence is farmer need for more efficient use of feed. Animal breeders refer to the new type as intermediate. That means between the older cob-roller and the later stilt-legged, high-back extremes. The description isn't very definite.

So specifications for the new hog have been set up. They ought to help farmers recognize and produce the type. In Iowa they are being used along with sample animal and carcass comparisons at a series of field day meetings. Midwest packers, the Iowa Swine Producers Association and Iowa State College are co-operating in acquainting farmers with the type.

At the field days, farmers gather around 3 sample hogs. E. L. Quaife, extension swine specialist, gives specifications for the new type: It should be well enough finished at 200 to 230 pounds to top the market. At that weight the hog should measure 42 inches from between the ears along the back to the tail base. He will be 11 to 12 inches wide and 14 to 15 inches deep back of the shoulder. The carcass will be about 31 inches long from the aitch bone to the first rib at the breast bone. There'll be about 1½ inches of back fat. Loins, bacon, hams and other cuts will have eye-appeal that the buyer can't resist.

Those physical measurements are not greatly different from those of hogs many farmers have been raising the last few years. But the warning is out that future hog development must continue down the middle road. We must have the kind of hog that will produce pork cuts the housewife wants.

Quaife lets the hogs speak for themselves at these swine field days. Part of the story can be told by the array of carcasses and cuts of meat from various types. Here's what a group of farmers sees:

In one pen is the short, chubby, overfat hog that finishes at less than 200 pounds. After that it puts too much corn into more fat. Mr. Fat Boy had his heyday back in the early 1900's, but there is little use for him now. He is at fault on 3 charges—in the feed lot, in the packer's coolers and in the butcher's meat counter.

Simple economics should rule

Reprinted by permission from Capper's Farmer, June, 1946, Topeka, Kansas

out the lard-type hog. There can be no disagreement with the forecast that fats and oils will go from scarcity to surplus before many years. Imports are on their way back. This country boosted output nearly 25 per cent during the war. Such increase especially in lard will face reduced demand. Hog prices will be pulled down too unless we have a hog that puts the feed into lean rather than fat. The chunky hog doesn't do that. Farmers can see proof in its carcass on the rack.

There is more to it, tho, than the economics of lard. The chunky sow seldom farrowed large litters. Her pigs never made the most economical use of feed. That is the fault of the chunky pig in the feed lot.

Packer's point out that they don't want this kind of hog because too much of the poundage must be trimmed off for lard. Even with the trimming, chops and bacon have too much fat. There you have faults two and three.

Over in another pen is Mr. Long and Slim. It's quite a distance from his ears to his tail. This is the "big type" that came into its own during and after the first World War. Many men sitting around the ring still feel this isn't a bad type of hog for Iowa and the Midwest. For special types of farming, the big hog may not be so bad, but on the average he has as many faults as the short chunk. As Quaife points out, the big gilt or sow will produce good-sized litters. Fact is that's the main reason the big type was developed. Chunky hogs nearly put themselves out of business with 2- and 3-pig litters.

The main trouble with the big hog comes in the feed lot. It matures slowly. At 200 or 225 pounds this hog is still growing. He lacks finish—there is little fat over the back or in the cuts of pork. More feed is needed which may stretch the feeding period 8 or 9 months, and carry him to 300 or more pounds before he is ready for market.

Packer buyers have a word against this big hog, too. If he is slaughtered at 225 pounds the carcass will not have enough fat to make good cuts. When carried to 300 pounds or more to get the finish, cuts themselves are too big and odd-sized. Those are also the homemaker's criticisms.

By this time the farmers around the ring are taking a sober second look at the hog in the third pen. That's the intermediate type previously described. The last war gave the middle hog a boost. Ceiling and support prices generally favored the porker that was well finished at 200 to 240 pounds until fat needs became acute. With the war over, the place for the middle hog should be made even more secure. The

farmer needs him, the packer needs him and the consumer wants him.

In the farrowing house the intermediate gilt has proved her worth. Her litters are large—larger than the chunky sow and may be just as large as the big, rangy type. In the feed lot intermediate hogs have a good record. Finish is reached at 200 to 240 pounds. If the need arises, that weight can be pushed a little higher without hurting the carcass too much. The pig will reach that weight in 5½ to 6½ months. That suits the farmer who wants to raise 2 litters a year.

When it comes to making use of feed the intermediate pig does a little better job than the rangy and a much better job than the chunky ones. When ready for market is has the kind of finish that makes the carcasses look good on the cooler hook. That is what the packer is interested in because he is after the carcass that will please Mrs. Housewife. And packers at the swine field days drive that point home to farmers.

Predicting Production in Heifers

Condensed from The Southern Planter

From 10 to 12 million heifer calves are born in dairy herds each year. Farmers select and keep about half of them for future milk cows. By the time the 5 or 6 million selected calves reach milking age, they will have cost the dairymen around $125 each, or a total of between $625,000,000 and $750,000,000 annually. If dairymen had a simple and reliable method of determining the future milk-producing ability of heifer calves, they could avoid the time, labor and expense of raising those that turn out to be unprofitable.

Some years ago the Bureau of Dairy Industry began a study of the dairy calf udder to determine whether there is any relationship between the glandular formations at early ages and future milk-producing capacity. The investigators discovered that the mammary glands begin to develop soon after the calf is born and that they pass through a series of definite stages as the calf gets older. They also noted that some calves reach a definite stage of glandular development much earlier than others, and some much later.

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The size, shape, and stage of development of the gland in each quarter of the udder can be determined by feeling through the skin with the fingers. After examining about 20 calves at monthly intervals, from birth to 18 months, the investigators assembled their results and established a "standard" for measuring the development at various ages.

All heifer calves in the Beltsville herd are now examined and a numerical grade is assigned, which indicates whether the stage of development is ahead of or behind the standard, or average, for any given age. Grades range from "1" for the most retarded to "9" for the most advanced development. When the calves eventually come into milk production, their production records are compared with the grades that were assigned to them as calves. Very often the heifer with the best looking udder from the outside has the poorest glandular development inside. This fact has fooled many dairymen in the past.

Nearly 100 cows (52 Holsteins and 45 Jerseys) that were graded for mammary development when they were calves have now completed production records. Those that were judged to have advanced development (grades 7, 8 and 9) at 4 months of age have produced approximately 4,000 pounds of milk a year (on the average) more than those with retarded development (grades 1, 2, and 3). The grades assigned at about 4 months of age were a better index to future production than the grades assigned at other ages.

The results obtained in the Beltsville herd are encouraging, since they indicate that it may be possible to predict the relative producing ability of dairy calves at 4 months of age. But the investigators are not yet ready to recommend the method for general use because they don't know whether it will work as well in other herds as it has in the experimental herd at Beltsville. The Beltsville herds are unique, in that they have been bred up to a very high and uniform level of milk production through the use of proved sires. The method must be regarded as still in the experimental stage. The present need is to test it in a larger number of other herds.

Already the method is being tried out by breeders in widely separated parts of the country and the population of the heifers picked for "advanced development" is anxiously awaited. We examined a number of heifers in the Beltsville herd and the variation in milk gland development among individuals is remarkable. The method is almost sure to be improved and adapted as an important part of heifer culling.

The Romance of the Fig

Philip Ferry

THE FIG has held a prominent place in the history and literature of the peoples of the world. A native of the thermal belts of the Mediterranean Basin, particularly Asia Minor and North Africa, where the tree has been grown from time immemorial, the fig is now being grown in the warmer sections of the United States. Here, as in Asia Minor, the Smyrna fig is the No. 1 variety. The story of the introduction of the Smyrna into this country is a saga of the almost fanatical passion of the American grower for experimental research.

Although several types of imported figs were grown in California prior to the introduction of the Smyrna (the Spanish padres had planted the Mission variety as early as 1769), these lacked the quality, the flavor and the soft skin of the Smyrna of the Old World—points which prompted California orchardists to import Smyrna cuttings from Turkey and Smyrna.

The resulting trees grew vigorously enough, but the fruit failed to mature. Despite these initial setbacks, far-sighted growers continued their efforts to grow the Smyrna in America. Investigation brought to light the fact that the flower of the edible fig produces no pollen and is thus unable to achieve voluntary fertilization; while the buds of many other varieties, known as common figs, produce pollen but bear seedless fruit.

The problem that challenged the American horticulturist was how to bring these two frustrated elements into some sort of mutual assistance pact. However, the matter was complicated by the fact that the fig tree has no blossom in the popular sense of the word—unless the fig itself be considered such. In spring, when the valleys are colorful with the blooms of other fruit trees, the fig puts forth leaves and tiny fruit, thus differing from other cultivated trees in that the leaves and fruit appear simultaneously.

The veil of mystery surrounding the development of the Smyrna was partly penetrated when observing travelers brought back word that the Smyrna of the Old World was pollinated by the Fig Wasp (*blastophagas psenes*), an insect that carries pollen from the flower of the wild caprifig to the "female" receptacle of the Smyrna fig. California orchardists imported caprifig trees and planted

them alongside their Smyrnas. Still the fruit of the latter failed to mature. A number of wasps were imported but the insects died, apparently for lack of caprifigs in which to breed.

Still uncertain whether pollination of the Smyrna could be achieved by the transfer of pollen from the caprifig, California growers experimented with artificial insemination. Taking pollen from the blossom of the caprifig, they transferred it by hand to the "eye" of the Smyrna fig. The success of this experiment proved that "caprification" was indeed the key to the pollination of the Smyrna. Certain that the riddle was on its way to being solved, several American growers went to Asia Minor to study the problem and unlock, if possible, the secret of the Smyrna.

To the Americans' great disappointment, they found that while the simple natives of that ancient land were fully cognizant of the part played by the Fig Wasp in the germination of the Smyrna, they were utterly ignorant of the manner in which this vital act was performed. Continued observation eventually divulged the whole elusive process. In the nonedible fruit of the wild or caprifig, breeds the tiny wasp whose only known function is to pollinize the fig. The pistils of the caprifigs have short styles which permit the blastophagas to deposit their eggs in the ovaries. When these eggs hatch, the insects emerge from the caprifig through the eye at the apex and in so doing brush against and carry off the loose grains of pollen.

At this stage the grower plays a heartless trick on the Fig Wasp. Transferring figs containing wasps from the caprifig trees to the Smyrna trees, he exposes the pollen-dusted wasps to Smyrna figs instead of caprifigs. The bewildered female blastophagas, in crawling over the long-styled pistils in a vain attempt to deposit their eggs, transfer the caprifig pollen from their bodies to the Smyrna fig and thus pollination of the latter is accomplished.

This whole succession of events, from beginning to end, is the old, old trick employed by nature to lure flying creatures to deposit on one plant the fertilizing pollen accidentally picked up from another plant. Walk into any Calimyrna orchard in early summer and you will find small wire baskets of caprifigs hanging at intervals from the Smyrna trees, for the three-way working arrangement involving the caprifig, the Smyrna fig and the Fig Wasp is the only known method of fertilizing the Smyrna.

The solution of this problem stimulated widespread interest in the commercial production of the Smyrna, and orchards were

set out all over California. Today some of the largest fig orchards in the world are found in the Golden State. Justifying its sponsors high hopes, the Smyrna has proved satisfactory in every respect, whether for shipping, for drying or for fresh consumption. Today, the California fig crop, with the Calimyrna selling at excellent prices, is one of the state's most valuable agricultural assets. In this connection, it is interesting to note that this rich harvest is utterly dependent upon the visitation of that unsuspecting little insect called the Fig Wasp.

Hybrid Vegetables

Condensed from The Flower Grower

Donald F. Jones and Amanda Quackenbush

Connecticut Agricultural Experiment Station, New Haven

THE story of hybrid vegetables is comparatively new, but very important to the grower. It is only a little more than 20 years since the first commercial sweet corn hybrid was produced. Today, corn growers are making millions of dollars additional profit annually because of this discovery, and the idea of better vegetables through hybridization has spread until today we have hybrid varieties of squash, onions, cucumbers and tomatoes on the market. And this is only the beginning — many other vegetables could be hybridized, and probably the time is not far off when they will be.

What is the advantage of hybrid vegetables? The answer is that, in some way, the crossing of two distinct types of animals or plants almost always increases the vigor of the offspring. This is a genetic principle that has long been known and applied in animal breeding. The mule, a sterile hybrid of the horse and ass, is a common example.

However, nothing is gained by haphazard crossing. Parent inbreds must be carefully selected for desirable qualities which the breeder wishes to reproduce in the offspring. By careful selection, the best qualities of each parent will appear in the hybrid, intensified by the increased vigor which results from combining two unlike inbreds.

In 1908, this principle was

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first applied to vegetable breeding by Dr. George H. Shull, a biologist at the Carnegie Institute in Cold Spring Harbor, Long Island. Dr. Shull found that crossing uniform inbred strains of corn produced plants that were more vigorous and gave much higher yields than the parent stock.

Although Dr. Shull's work pointed the way, his early corn hybrids were not practical commercially. Dr. Shull had made a *single cross*, a hybrid from two inbred parents. The hybrid seed, being produced on inbred plants, was small and poorly matured, and, since the inbred parents, the seed source, were small and unproductive, it was too expensive for general use. It was not until the *double cross* method of producing hybrid seed was invented and used at the Connecticut Agricultural Experimental Station in 1917, that hybrid corn could be used profitably. By this method, a hybrid was made between two single crosses. Seed of this new hybrid was large, plump, well-matured and easy to produce, since high-yielding single cross hybrids were used as seed plants.

Just how feasible this double-cross method has made hybrid corn can be judged by the fact that in the Corn Belt last year, over 90 per cent of the corn grown was hybrid, all double-crosses.

Producing the seed for this hybrid corn has become a "big business" undertaking. Thousands of acres of "crossing rows" are grown each year by seedsmen who know how to produce hybrids that are adapted to each section to give proper maturity and the best possible yields.

In well isolated fields, alternating rows of two different inbreds are planted so that the seed-bearing flowers, the silks, of one inbred will appear at the right time to be fertilized by pollen from the other or pollen-bearing inbred. To insure cross fertilization, the tassels on the seed-producing rows are pulled out before any pollen is shed. The result is that each kernel is a hybrid. The pollen rows are not used for seed.

The seed ears are harvested as soon as mature, carefully dried in seed corn dryers to the right moisture content, shelled, cleaned and graded for size and shape. Such seed, properly grown and processed, not only has hybrid vigor, but can be planted in such a way as to give nearly perfect stands.

This highly specialized industry is necessary for the production of good seed corn. Seed from hybrids cannot be saved and planted next year. The grower who tries this method will find that the results are not what he hoped for and expected. Hybrid vigor is not permanent. The second generation grown from the

fine-looking ears falls off in yield about 20 per cent as a general rule. Uniformity is also lost and the second generation will vary greatly in size and shape of ear, height of plant and time of ripening. To gain the good qualities of hybrid corn, newly crossed seed must be planted each year.

Squash. Hybrid summer squash was the second hybrid vegetable to make its appearance. In 1937, at the Connecticut Agricultural Experiment Station, a cross was made between Early Prolific Straightneck, an excellent commercial variety, and a Station inbred strain. The hybrid vigor precept was proved once more, Yankee Hybrid, as the new variety was called, ripened fully a week ahead of standard varieties and consistently produced a greater amount of fruit during the early growing season—a boon to squash growers who get bigger cash returns on early squash. Moreover, the Yankee Hybrid squashes are considerably larger than the fruits from inbred varieties.

The mechanics of producing hybrid squash are somewhat similar to those used in making hybrid corn. The male (pollen-producng) and female (fruit-producing) flowers of all cucurbits grow on the same plant. To produce a hybrid squash, alternate rows of the two inbred varieties that are to be the parents are planted. All the male flowers are picked off of one variety—this then, becomes the female parent.

Commercial seed producers depend on bees to transfer the pollen from the neighboring rows, which still retain their male flowers, to the receptive portion of the flowers of the female parent. Then the pollen germinates and sends tubes down through the pistil to fertilize the ovules (egg cells) at the base of the female flower, and the hybrid squash results.

Cucumbers. In their latest seed catalogue, W. Atlee Burpee Co. announces that seed of a hybrid cucumber is now available—the first to be produced commercially. The catalogue calls the cucumber "highly resistant to bacterial wilt, mosaic and downy mildew, extremely vigorous, long-lived and bearing an abundance of well-formed green fruit."

Since the spreading nature of the cucumber vine would make it extremely difficult to remove all male flowers from one parent, crossing of this vegetable is usually done in the greenhouse.

Spring Freshening Cows Can Produce More Milk

Condensed from Holstein-Friesian World

W. T. Crandall

THERE will be a need for 10 per cent more milk in November 1946 than was produced in November 1945. This needed increase in milk can be obtained if all the cows that freshen in 1946 previous to September are supplied with adequate amounts of feed during the summer months so that abnormal slumps in their daily production will be prevented.

Studies of dairy herd improvement association records show that cows freshening in the fall produce more milk than do cows freshening at any other time of the year. Year after year 40,000 to 70,000 association cows have been sorted into groups according to their month of freshening. The cows freshening in October or November have always averaged the highest in yearly production. In 1944, November freshening cows produced an average of 728 lbs. of milk more than April freshening cows and the November freshening cows also averaged $25 more in income over feed cost.

Losses in the summer production of spring freshening cows is one of the most serious losses in the dairy business, and are losses that in most cases can be lessened. A cow's inherent ability to produce persistently and on a high level is the same whether she freshens in the spring or in the fall. That ability remains the same throughout every month of the year and every year of her life. It is her environment, or things that happen to her from the outside that determine how much she actually produces. Good feeding, care and management will get somewhere near the full inherited production capacity from a cow.

The seriousness of the situation lies in the fact that thousands of our cows are producing hundreds of pounds of milk less a year than they are capable of producing merely because they happen to freshen in the spring and are on July and August pasture during the early part of their lactation period when they are or should be making their heaviest produc-

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tion. July and August are months during which permanent pastures normally make very little growth and consequently furnish much less feed than they do during earlier and later months when lower temperatures and better moisture conditions prevail. A spring freshening cow is just nicely started on her year's production and somewhere near the height of her capacity for daily milk production when this slump in permanent pasture yield occurs. Also in these months, heat and flies take the edge off a cow's appetite for a heavy consumption of feed. These same adverse conditions do not occur in the early lactation of a fall freshening cow. It's worth mentioning that a fall freshening cow is far enough along in her lactation period to be making rather rapid drops in daily production when she is turned on flush and stimulating pasture with a resulting up turn in her daily milk production. Spring freshening cows get this stimulation from flush pasture too early in their lactation to profit to the same extent as do the fall freshening cows. Fall freshening cows are on the latter or last months of their lactation when pasture slumps occur and their needs for nutrients are at a low point.

Dairymen should make every effort that is practical to get full production from every one of their cows. This is important because higher production from a cow means more profitable production and it is important because the production of the daughters of a bull can never truly measure his transmitting ability unless their records measure their producing abilities. A bull is playing in hard luck in most herds when his daughters freshen in the spring and their records are compared with records of dams that freshened in the fall.

This problem cannot be met by having all cows freshen in the fall. This is not likely to occur since it is more difficult to keep cows freshening regularly in the fall than in spring. From the standpoint of meeting market demands there should be more fall freshening cows in New York and dairymen should gradually adjust their breeding schedule to that end. It is not desirable to delay the breeding of cows several months in order to change them from spring to fall freshening. If the cows that freshen in October and November are bred in their second heat period or 50 to 60 days after calving, more of them will again freshen in the fall. Heifers born in the fall can be well-grown by good feeding and bred to freshen at two years of age. Cows must be safe in calf by January 23rd if they are to freshen around November 1st.

Since dairymen will always have some good cows freshening in the spring they must work out the problem of supplementing pastures with sufficient amounts of other roughage feeds to insure full production. Dairymen have worked out this problem in different ways, but in every case success has come only when ways have been found for keeping cows well-filled with roughage feeds throughout the summer. When pasture fails it is neither profitable nor safe to supply all the additional need for nutrients from concentrate feeds. Improved pastures are a great help to better summer feeding but few are adequate in July and August. Dairymen who maintain full production throughout the pasture season do so by pasturing legume meadow aftermath or annual green crops such as sudan grass, oats or soybeans and by feeding hay crop or corn silage and dry hay. The one most important thing to keep in mind is that heavy producing cows must be kept just as full of roughage feed in summer as in winter and fed in addition such concentrate feeds as production levels require or production is bound to be lower.

The Speed Sprayer

Condensed from American Agriculturist

A. B. Burrell

Professor of Pathology, Cornell University

THE Speed Sprayer represents a bold departure from the conventional orchard spray machine. The spray mixture is introduced through 100 to 150 nozzles, at not over 70 pounds of pressure into a current of air. The pump is of the centrifugal type, with a capacity of about 250 gallons per minute. The liquid not going through the spray nozzles is forced out of several holes spaced along a pipe on the bottom of the 500 gallon tank, to provide agitation of the mixture. This hydraulic agitation replaces the usual shaft-and-paddle assembly.

A huge moving mass of air generated by a 4-blade wooden fan, carries the spray through the tree. The fan is directly driven by a gasoline engine of 110 horsepower. The air current is driven toward the rear and then is deflected sidewards and upwards by means of a series of metal plates, which can be tilted by the operator. All or certain groups of nozzles may be turned on and off from the tractor seat.

The so-called "apple head" directs the air-stream and spray to one side only. The "peach head" is for smaller trees and sprays both ways from the machine at once. The Speed Sprayers come mounted on a single axle with either dual wheels or single large wheels, or with 2 axles and 4 tandem wheels. Usually one man drives the tractor and operates the Speed Sprayer, while another hauls water or spray mixture in a refiller tank. Another model of the Speed Sprayer, larger than the one described, has been produced in limited numbers. Along the Atlantic Seaboard about 680 of these machines have been sold to growers of apples, peaches and cherries. These machines sell for well over $3,000, and if a good refiller tank is included, the cost is about $4,000.

To find out how these machines were operating, I sent a questionnaire to 14 owners in eastern New York, and received 12 replies. The men differed some in their reports on coverage of tree-tops but all agreed that coverage of foliage and fruit on the inside of the trees was especially good.

In reply to the question as to the acreage heavily sprayed in ten hours, the answers varied from

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"close to 50 acres" to "15 acres, 35 trees per acre, 30 gallons per tree." The average rate of spraying is 1,250 gallons per hour, and ranges from 950 to 1,750.

All reported a saving of manpower, the commonest reply being that only half as much labor was used.

Three men replied that the performance of the machine justified its cost; three said "yes", with qualifications; three "possibly"; two answered "no"; and one did not answer. Opinions on acreage required for efficient operation varied greatly. One man said that a grower should consider a Speed Sprayer with as few as 20 acres of mature orchard, where help is scarce; two said that the minimum should be 50; three said between 50 and 100; three said 100; one, from 150 to 200; one said 200 or more.

Comments on the questionnaire, as well as those made to me verbally, seem to warrant the following conclusions. Owners generally felt that: (1) Speed Sprayers assist greatly when farm help is scarce and inexperienced; (2) the fundamental principles involved in the sprayer will be permanently valuable; (3) the Speed Sprayer requires an operator with excellent judgment; (4) mechanical improvements are needed; (5) the machine can be used efficiently only on rather large acreages with trees spaced closely enough to permit continuous spraying.

In conclusion, it should be pointed out that the Speed Sprayer is not the first sprayer to utilize a current of air to carry the spray into the tree; a prominent predecessor was the "Liquiduster", which, however, worked on the principle of moving a small volume at high velocity, rather than a large volume.

In the years to come, the Speed Sprayer will face stiff competition. At least one smaller and cheaper "air-blast" sprayer is on the market and others may appear. High pressure machines still are highly regarded by most growers and doubtless will be improved. The combination of a high pressure sprayer with a vertical boom equipped with moveable, adjustable nozzles, is believed by some to be more promising than the Speed Sprayer.

Dusting may receive new impetus from the discovery of more potent insecticides and fungicides. Large volume dusting machines, either with or without supplementary liquid to bring about greater deposit and adherence of the dust, may prove desirable. Power atomizers or mist-blowing machines distributing concentrated contact insecticides are being tested against certain pests.

Termites Work Under Cover

Condensed from The Farmers Guide

No one likes to know that a destructive force is working against them under cover, for there is a mental hazard about fighting an unseen enemy that makes the job doubly difficult. But when that unseen force happens to be those insect-invaders known as termites, some fighting must be done if the damage is to be stopped. How difficult this job of fighting will be depends to some extent upon when it is done.

It is a comparatively simple matter to fight termite destruction if it is done at the ideal time —when the house or farm building is built. Certain precautions can be taken at this time which will save the owner much time, money and worry later on. But obviously, that method of control offers nothing to the home-owner where termite infestation is already severe, or where there are signs of future trouble.

Several facts make it difficult to outwit these too-industrious insects. In the first place, fewer woodlands and more centrally heated houses contribute to an increased amount of damage from termites every year. It has been found that termites were present in our section of the country even in Indian days, but at that time the woodlands furnished an ample supply of their natural diet, which is dead wood, and little damage to buildings was noticed. Another reason they are hard to control is their tendency to work under cover—many times they go unnoticed until the infestation is severe.

It is well, therefore, to look the place over occasionally for signs which might betray their presence. If they are found, then continue the check-up periodically, for while termites may live in a building for several years without much damage, it is possible for a great deal of destruction to be done in six months. The surroundings, the condition of the wood, and the strength of the colony will govern the extent of their damage.

How to Detect Termites

Since the type of termite common to the mid-west cannot withstand the drying effect of the atmosphere, they never live in the open, but build elaborate tubes and passageways from beneath the surface of the soil to the material upon which they are feeding. Careful inspection will usual-

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ly reveal these brown shelter tubes connecting the wood with the soil. A check-up will therefore include a search for these connecting tubes as well as an investigation of cellar window frames, steps, supporting timbers, etc., which should be checked for soundness.

If termites are detected, or their presence even suspected, it is well to drive stakes of unpainted yellow pine in the ground about the building. A couple of months time will show whether or not these destructive pests are abundant in the vicinity.

Were it not for the destruction they cause, one would have to admire the persistence, industriousness, efficiency, and organization of the termite colony. The colony contains several mating pairs, chief of which is the king and queen; the soldiers, who guard any broken spots which appear on outside walls; and workers, who with their chewing mouth parts, do the actual damage.

Breaking the connection of the termites from the soil to the building, and keeping it broken, is the only way that destruction can be controlled. This is why structural measures during building are so effective. One who plans to build in postwar years, or remodel, would do well to obtain a copy of "Outwitting Termites," a publication of the Natural History Survey Division of the state of Illinois. This circular describes in detail, with descriptive illustrations, the structural methods which will prevent termite attack on buildings.

If the buildings are old, chemical measures are the only way to check damage by termites—but such measures should be used only after correcting in so far as possible the conditions which make termite damage possible. For instance, by removing old wooden steps and installing new ones on a concrete base and foundation, much of the danger from termite attack can be eliminated. Any such remodeling that keeps the building and the soil from being in contact is a step in the right direction, and should be done before applying chemical measures.

Two methods of using chemicals are possible—the impregnation of wood with repellent or toxic chemicals, or chemical treatment of the soil around the foundation cracks or voids where termites enter the buildings. The method of treating the wood has this disadvantage—it does not prevent termites from reaching untreated wood, as they will simply build their protective tubes over it and feed upon the most distant wood.

The second method is therefore preferable—that of establishing a barrier between the

building and the insects by treating the soil around the places where they enter the building. This is the principle employed by commercial pest exterminators, who of course have time and labor saving equipment and materials for this purpose. However, for simple situations it is possible for an inexperienced operator to give an effective chemical treatment if he is willing to be painstaking and thorough in his work. Success of such a treatment will not be complete, however, unless the proper follow-up treatment is given. Because the termites cannot subsist without the moisture of the soil, the ones that are above ground when the chemical is applied will attempt to build tubes back to the soil, so conditions of this kind must be corrected as soon as they occur. All these visible tubes and galleries must also be destroyed before the soil is treated.

Chemical Barriers

Briefly, such points as the following must be given a soil treatment sufficient to create this chemical barrier. In most cases, a trench from 6 to 12 inches wide and 14 to 16 inches deep is necessary around the foundation.

All potential points of entry such as walls, piers, or masonry joints, porches, steps, earth-filled terraces, or termite-penetrable masonry floors, cracks and openings in masonry walls, piers, foundations or floors should be treated to kill the termite life that may be within.

A cheap spray pump, or a hose attached to a funnel will enable the home owner to apply the chemical in many hard-to-reach spots. When trenching along the foundation, the chemical is usually mixed with the soil as it is replaced.

Two Formulas

Several chemicals are available which may be used in combination for this purpose, but so many factors must be taken in consideration in recommending their use that it is impossible to treat each one fully. The two formulae suggested in the circular "Outwitting Termites" are as follows:

"Trichlorobenzene 2 parts, fuel oil 4 parts (by volume), the mixture to be used at the rate of 3 gallons per 100 cubic feet of soil.

"Sodium arsenite 15 pounds, water 10 gallons, applied at the rate of 10 gallons of solution to 10 cubic feet of soil. If it is found that more than 10 gallons of water are necessary to wet 10 cubic feet of soil thoroughly, the 15 pounds of sodium arsenite should be dissolved in the total water necessary for this volume of soil."

Some Chemicals Hazardous

Certain precautions must be observed when using chemicals. The arsenicals, for instance, are poisonous to man and animals

and must not be used where nearby wells might be polluted. It should also be kept in mind that certain fuel oils and other organic compounds are inflammable, and when mixed with air in certain concentrations, are explosive. In order to eliminate any hazards, the inexperienced operator should become thoroughly familiar with the nature of the chemical used. If termite infestation is severe it is best to secure the services of professional operators. In many communities such services include a periodic check-up to assure continued effective control.

Forced Molting of Layers

Condensed from The Ohio Farmer

E. L. Dakan

For years poultrymen have been wondering how to force their hens to rest when eggs are cheap in the spring and early summer and then bring them back into production in the autumn and winter when eggs are high in price. For several years we experimented with this method of management and gave it up as a bad job, for nearly always our hens molted not only when we forced them in the early season but molted again later in the autumn and winter and in only one trial were we able to manage the birds so we got more eggs and more money at the end of the year by forcing the molt.

G. O. Hall of Cornell University has just published a summary of experiments which are interesting. He had some new ideas on how to stop the hens laying. In one pen he removed the feed and water for one day. The next day the birds were allowed to drink for three minutes. They were not fed until the third day after the experiment started. The production from this pen of birds dropped off rapidly to about 15 per cent.

In another pen, the birds were fed and watered the same as described above, but in addition all daylight was excluded from the pen and only a dim blue light provided enough illumination so that the birds could see to eat and drink. This blue light burned from eight in the morning until four o'clock in the afternoon.

In a few days this pen of birds

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practically ceased laying. In other words, removing the birds from ordinary daylight or from ordinary white light was more effective in stopping egg production than was the removal of the feed and water alone.

There was a marked decrease in body weight immediately following the start of the experiment in both pens. The birds lost approximately 27 per cent in weight. The birds in the pen where feed alone was restricted molted slowly, whereas the birds in the pen with both the restricted feed and restricted light molted very rapidly.

Another pen of birds was fed and cared for in the usual, normal way. That is, efforts were made to keep them in production throughout the summer. At the end of the experiment, here is what happened in dollars and cents and that is the proof of the pudding!

VALUE OF EGGS PRODUCED

Month	Feed Restricted Value	Feed and Light Restricted Value	Normal Feed and Management Value
June	$ 6.51	$ 1.76	$ 17.65
July	2.94	.19	19.91
Aug.	5.33	3.46	18.32
Sept.	19.78	22.89	15.37
Oct.	15.47	21.85	9.68
Nov.	8.10	16.63	3.21
Dec.	8.49	14.92	5.43
Jan.	12.72	13.88	11.94
Total	$79.34	$95.58	$101.51

When the experiment was repeated another year, the pen with restricted light made a few dollars more than the birds that were fed and managed normally.

For those of you who want to save feed this summer, you had better cull your hens every week and sell them. For those of you who want to make money in the poultry business, you had better have all pullets in your laying flock next autumn. That is the best way to get eggs when eggs are high in price.

New Fumigant Controls Most Important Greenhouse Pest

Condensed from Farm Research

W. E. Blauvelt
Ithaca

One of the major problems in greenhouse flower production is the protection of crops from damage by the many destructive pests that thrive the year around under the favorable greenhouse temperatures. Most serious of these pests is the red spider mite, which is destructive to many kinds of plants, and costs millions of dollars a year in damage to crops and expenditures for control.

The most urgent need of improved control measures has been for greenhouse roses. None of the previously available sprays, dusts, or fumigants has given satisfactory control on this important crop, and selenium soil treatment has also been ineffective. Rose growers have been forced to rely on the primitive method of syringing, or directing a forceful spray of water under 100 pounds pressure up through the foliage to wash off the mites. This has many serious disadvantages.

A New Fumigant

Azobenzene, used as a fumigant in vapor form, appears to offer for the first time, a satisfactory chemical control measure for red spider mite on roses, as well as an improved control measure for many other florist crops.

An effective fumigant has great advantages over even the best of sprays or dusts in ease and cheapness of application, and in the fact that the gas or vapor form permeates the air and reaches all the mites, whereas many are missed by the most thorough spraying that is practical.

The writer discovered the effectiveness of azobenzene as a fumigant while testing a dust containing 20 per cent of azobenzene which Dr. Robert C. Haring, of the National Aniline Division, Allied Chemical and Dye Corp., had previously found to be highly effective. Observation that the orange color of azobenzene disappeared from the dust coating after a few days suggested the possi-

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bility that azobenzene might be volatile enough to be effective as a fumigant, if vaporized by heat. Experiments proved it to be extremely effective against both the mites themselves and the resistant egg stage. It is interesting that many of the mites die slowly from the effects of azobenzene, with some surviving for a week or more before succumbing. If results had been judged only on the basis of counts a day or two following treatment, the high effectiveness of the material might have been overlooked.

Numerous experiments were made in small greenhouse sections and houses at Ithaca to determine concentration or dosage, methods of vaporizing, rate of vaporization, length of fumigation period, proper temperature and humidity, and various other factors of importance. Even with the resistant populations on roses, kills of over 99.9 per cent of both mites and eggs were obtained with the amazingly low dosage of 8 grams of azobenzene per 1,000 cubic feet of greenhouse space, or 1 pound to approximately 57,000 cubic feet.

During 1945, tests were made in 25 commercial greenhouses in six different ranges, under various weather conditions, and in houses of 4,000 to over 15,000 plants each, and up to 350,000 cubic feet in size. Through these tests was developed a method of azobenzene fumigation giving kills of over 99 per cent of mites and eggs, with no foliage injury of any importance under proper conditions, to the various commercial varieties of greenhouse roses. Best results have been obtained from a six-hour fumigation period, at greenhouse temperatures between 75 and 80° F, with the azobenzene vaporized over a two hour period at the start of the fumigation.

A simple and convenient method of vaporizing the material was developed which requires no special equipment. A wettable powder containing 70 per cent of azobenzene by weight is mixed to a paint-like consistency with water, and brushed on the surface of a number of cold steam pipes the length of the greenhouse. As the pipes heat up, the azobenzene melts and comes off as an orange-colored vapor, which quickly diffuses through the air of the greenhouse. With this method the operator need be exposed to the vapor for only short periods while turning on pipes and checking the temperature.

Because of urgent need, azobenzene fumigant was made available to growers as soon as commercial amounts could be produced. Although azobenzene was first synthesized more than 100 years ago, it has had no industrial uses, and therefore had to be made especially for use as

a fumigant. Since the first commercial product was put on the market in November, 1945, over 30,000 pounds of azobenzene powder have been purchased by growers throughout the country, and the demand has far exceeded the supply. At present four companies are marketing the recommended powder formulation containing 70 per cent of azobenzene, with directions for use as prepared by the writer.

Reports received from 75 rose growers in more than 20 states indicate that azobenzene fumigation is working out well in commercial use. Few instances of any serious foliage injury have been reported, and most of these have been due to too low temperatures during fumigation. One objectionable effect has developed which did not show up to any extent during the period of experimental treatments. This is a marked reduction in intensity of color of the buds of some red and pink varieties, lasting for several days to two weeks. It is associated with the effect of the cloudy weather prevalent during the late fall and winter months.

Azobenzene fumigation promises to be of great value to the rose growers of the country. Syringing can be entirely eliminated, with a saving of over 90 per cent of the labor cost of red-spider-mite control, amounting to one million man hours a year. Through eliminating syringing, the destructive black spot fungous disease is eliminated or controlled without the need for fungicide sprays. A single fumigation gives nearly complete freedom from red spider mite for periods of 4 to 16 weeks, and the cost of the fumigant is actually less than the cost of the water used in weekly syringing. A surprising effect has been the remarkable improvement in vigor of plant growth and in production and quality of roses following fumigations with azobenzene. Whether this is due entirely to the superior control of red spider mite or in part to physiological stimulus is not yet understood. Growers have reported increases in production up to 25 per cent, and up to 90 per cent reduction in percentage of shorts and culls.

The question of possible hazard to health in the use of azobenzene as a greenhouse fumigant is one requiring further research. Considering the low concentration of vapor and short exposures required, the danger would appear to be slight; no apparent ill effects have been experienced by the writer or by growers. However, until more is known, growers are advised to wear a felt-pad respirator while fumigating, and to avoid unnecessarily long exposure.

Azobenzene fumigation is promising for use on many other florist

crops. Trials in small to moderate-sized houses, with considerable numbers of the various plants, indicate that it can be used safely for carnations, gardenias, camellias, hydrangeas, geraniums, calceolarias, cyclamen, kalanchoes, ivies, ageratum, and numerous other plants. Only sweet peas and a few tender seedlings have shown any marked injury so far. With carnations, a major crop, a number of large-scale tests have been made in commercial greenhouses, with no injury beyond a slight bleaching of the color of open buds of some varieties.

Experiments are being conducted on other methods of vaporizing azobenzene, to allow its use in greenhouses where steam is not available. Good success has been had by melting and vaporizing the crystalline azobenzene over lamps or hot plates, but this method is not ideal. The use of pressure fumigating cans, as now employed for nicotine fumigation has shown great promise. Another interesting method, similar in principle, consists of burning coils of dynamite fuse coated with azobenzene in open-top cans.

Income from Crickets

Here is a source of farm income that is different. Don Sollenberger, of Noble county, Indiana, has averaged $200 a year from crickets the last 7 or 8 years. He has an orchard in a lake area where the insects are in demand as fish bait. He began selling crickets when he noted that they gathered in great numbers under straw used for mulching fruit trees. They appeared there earlier than at any other place in the community.

"I don't fool with them after the price goes below a penny a cricket," he said. "Early in the season, before they are available any place else, and when other bait is scarce, I can make $3 an hour catching them. Mrs. Sollenberger and I have caught $15 worth in a 3-hour period. Sometimes I get $2 worth of crickets under one tree."

—*Capper's Farmer*

Livestock Can Thrive on Moldy Corn and Sweet Clover Silage

Condensed from The Farmer

Of the 300 South Dakota and Western Minnesota stockmen who attended the Feeders' Day meeting at South Dakota State College, Brookings, in May, those who had been wondering how to dispose of moldy corn and those who sought a way to make good use of this year's sweet clover crop came away with exactly the information they wanted. They learned that soft corn, even though black with mold, and sweet clover silage are excellent feed.

Except for the experience with lambs, the result of this year's trials to learn the feeding value of soft, moldy corn were almost precisely the same as those conducted in 1944 and 1945. Fed to cattle 118 pounds of the soft, moldy ear corn plus six pounds of alfalfa hay equaled 100 pounds of hard ear corn; fed to lambs, the average of all trials showed 115 pounds of soft ear corn plus seven pounds of alfalfa hay equaled 100 pounds of hard ear corn, and fed to hogs 130 pounds of soft corn plus 2½ pounds of protein supplement equaled 100 pounds of hard corn in feeding value.

Put in terms of feeding costs the soft, moldy corn valued at 75 cents per hundredweight as compared to hard ear corn at $1.00 per 75-pound bushel and shelled hard corn at $1.03 per regular 56-pound bushel resulted in the cheapest gains.

Each of four lots of steers (10 head in each lot) were fed different rations, one lot got hard ear corn, alfalfa hay, and soybean meal. Another was fed soft ear corn, alfalfa hay and soybean meal. The third lot was fed soft ear corn and alfalfa hay, and the fourth lot soft ear corn that had been run through an ensilage cutter, and watered down as it was put into the silo. The lot fed soft ear corn produced the cheapest gains, $9.67 per hundred-weight; the lot fed the soft corn silage, the next cheapest, $10.19; the lot fed soft ear corn, alfalfa hay and soybean meal put on gains at a cost of $10.70 per hundredweight, and the lot fed hard corn, alfalfa hay and soybean meal put on the costliest gains of all, $13.53 per hundred-weight. The latter lot graded slightly higher but returned the lowest profit per head, $18. The lot fed soft ear corn

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and alfalfa hay returned a profit of $27.63 per head, the lot fed soft ear corn, alfalfa hay and soybean meal returned a profit of $27.69 per head, and the lot fed the soft ear corn silage and alfalfa hay returned the highest per head profit of all, $29.64. The per head profit was based on the grade of the animals as judged by cattle buyers the day of the meeting.

Running the soft ear corn through an ensilage cutter has an advantage in addition to its being a means of storing such corn. If a feeder has an empty silo in the spring, and has more soft corn than he can feed before the weather becomes very warm, he can ensile it for later feeding thus preventing its further deterioration.

Six lots of hogs were used in the experiment this year, two lots fed hard ear corn, two fed soft ear corn, one fed soft corn that had been shelled and dried and one lot fed proso millet. All lots except one getting soft ear corn were self-fed a protein mixture of two parts tankage, one part soybean meal, and one part linseed meal and they were also self-fed a mineral mixture consisting of two parts by weight of steamed bone meal, two parts ground limestone and one part salt. The protein fed one of the two lots getting soft ear corn was limited.

The cheapest gains, $7.00 per hundredweight, were put on the lot that got soft ear corn plus the self-fed mineral and protein mixtures. Next cheapest was the lot that got soft ear corn and the limited amount of protein. Gains on that lot cost $7.89. The lot fed the best quality of hard ear corn put on gains at a cost of $8.40 per hundredweight; the lot fed hard ear corn of slightly poorer quality put on gains at a cost of $9.13 per hundredweight and the lot fed proso millet and the self-fed mineral and protein mixtures put on gains at a cost of $8.91 per hundredweight. Costliest gains of all came of feeding the shelled and dried soft corn. That cost was $10.62 per hundredweight, and the reason given was the high cost of drying.

In the trials with lambs as in those with hogs and cattle, the soft, moldy corn was valued at 75 cents per hundredweight as compared to hard ear corn at $1.00 per bushel and hard shelled corn at $1.03 per bushel. Two lots of lambs were used in the trials this year, one lot getting hard corn, the other soft ear corn, and both lots getting alfalfa hay in addition to the corn. Feed cost per lamb for the lot getting hard corn and alfalfa hay was $4.43 and for those getting the soft, moldy corn it was only $2.74. There was no death loss in either lot this year. Last year there was a death loss amounting to a cost of 63 cents per lamb on those re-

maining in both lots, and two years ago, the loss in the lot fed hard corn was reckoned at $1.80 per head while in the lot fed soft corn it was 55 cents per head.

In the feeding of soft, moldy corn to any class of livestock, and particularly to lambs, it is recommended that as much of it as possible be fed before the warm weather of spring.

Intensely interesting to the feeders considering the possibility of ensiling sweet clover this year were the results of experiments with sweet clover silage at the college. Fed to fattening beef calves this silage compared favorably with corn silage. The sweet clover was ensiled July 2 and 3 last year when approximately 10% of the crop was blossoming. After cutting it was left in the field until well wilted and the moisture was down to between 55% and 69%. One hundred and sixty pounds of ground ear corn was added to each ton of silage as it was put in the silo. The cured sweet clover silage contained 6.4% protein as compared to the 3.2% protein content of the corn silage when it was cured.

Four lots of beef calves were used in the experiment. One lot got shelled corn, linseed meal and alfalfa hay, a second lot got shelled corn, linseed meal, corn silage and alfalfa, a third lot got shelled corn, linseed meal, sweet clover silage and alfalfa, and the fourth lot got shelled corn, sweet clover silage and alfalfa but no linseed meal. Figuring the sweet clover silage as being worth $15 a ton and the corn silage as being worth only $5 a ton, the lot fed the sweet clover silage, alfalfa and shelled corn without linseed meal made the cheapest gain, $9.36 per hundredweight. Next cheapest gain was in the lot fed sweet clover silage, shelled corn, alfalfa and linseed meal. The average cost of gain in that lot was $9.50 per hundredweight. The top lot in cost was the lot getting shelled corn, linseed meal and alfalfa in which the cost ran $10.11 per hundredweight, and the second lot in cost, $9.61 per hundredweight, was the one which got corn silage along with linseed meal, shelled corn and alfalfa.

Wayne County Shows the Way

Condensed from American Forests

J. O. Artman

THE PEOPLE in Wayne County, Tennessee, long subjected to the inequities of forest exploitation, finally have broken with the past, taken stock of their remaining timber resources and proceeded to better a situation that at one time seemed hopeless. They have demonstrated what can be accomplished when the "grass roots" processes are put in action.

Tennesseans can be proud of Wayne County. Progress made there in forest conservation has been equaled in but few sections of the South. The people have risen in righteous wrath and demanded that forest fires be stopped. Many farmers are now managing their woodlands on continuous production principles. A sawmill man recently refused to buy a tract of good timber because the owner wanted to cut everything and leave nothing for a future harvest. One lumber company, which owns 70,000 acres of land, has made a drastic reduction in its cutting budget and adopted a policy of *growing* timber. Such things are revolutionary in this section of America.

Wayne County has relatively little good farmland. Eighty per cent of its 471,000 acres is now in timber, and agriculturists say that the amount of open land will probably never exceed thirty per cent of the total. There are no railroads in the county and only the trunk highways are paved. The county's 13,600 residents are classified as rural. Waynesboro, the county seat and largest community, has a population of only one thousand.

Timber buyers discovered the valuable hardwood stands of the area about 1890, and during the thirty-five years that followed billions of board feet of choice poplar (tuliptree), hickory, chestnut and oak were cut and barged to St. Louis, Cinicinnati and New Orleans. The operators gave no thought to the future and were little concerned about the welfare of the county. It was their policy to buy land and stumpage cheap, skim off the cream, and move on. By 1928 the better hardwoods were gone and the loggers turned their attention to pine, which up to then had been considered worthless. The pine harvest lasted only ten years.

Only cutover remnants of the

Reprinted by permission from American Forests, July, 1945, Washington, D. C.

once unbroken timber stand remained in 1940, but still one out of every two of the county's able-bodied men worked at least part time in the woods or in wood-using industries. In this one year, 23,000,000 board feet of rough lumber and 34,000 cords of fuelwood, valued at $538,000 were produced. Imagine what the production must have been "in the good old days" when it was not uncommon for a saw crew to work a whole day felling one huge tulip tree, and when 500 wagon loads of railroad ties arrived at the Clifton docks in a single day.

Accelerating the depletion begun by the loggers, forest fires annually took a heavy toll; and soil, shorn of its protective covering, was washed into the streams. Stand on any hill in the county and you can see the havoc wrought by man in his ill-advised conquest of Nature. If you are a sensitive person you can even now hear and feel the last stages of the battle still in progress. The hiss and crackle of flames creeping through the underbrush, the roar of flood waters, the ring of axes and the crash of falling trees, the scraping of plowshares on rocky hillsides — these are the echoing voices of destruction, diminished now in volume but still audible.

Old-timers say that forest fires have been bad as long as they can remember; their frequency rose and fell with the logging cycle. The State Division of Forestry first employed fire wardens in the county in 1924, but with limited funds and inadequate public support, little good was accomplished. C. E. Lance, when he became county agricultural agent in 1930, reported from one-fourth to one-third of the total forest area being burned each year. In his first annual work plan he recognized the seriousness of the situation by including forest fire prevention as one of his major objectives.

In 1940, a TVA forester, cooperating with the State Division of Forestry, moved to the county. For a year he traveled up and down the county giving lectures, showing educational movies on fire prevention, setting up exhibits and through various other mediums doing what he could to convince the people that the ruthless destruction of forest resources was bad for them, bad for the state, bad for the nation.

People began to notice woods fires for the first time. Some even acknowledged that they were damaging, that they were caused by carelessness or maliciousness, and, most important of all, that they could be controlled. They began to understand, too, that the state fire-control organization was inadequately financed and that its efforts would have to be supplemented by local action. Conse-

quently, late in 1941, a group of interested landowners met to analyze the problem and plan a solution. Out of this meeting came the Wayne County Forest Protective Association, an organization of citizens dedicated to the task of protecting all of the forest lands in the county.

Soon after its inception, the association requested that the county court appropriate $450 to help finance one motorized fire-fighting crew. When the request was turned down, the association raised the money among its own membership and entered into a cooperative agreement with the state whereby its $450 was matched with state funds. A motorized crew was immediately organized and made responsible for fire control on 60,000 acres around the Waynesboro lookout tower. During its first season this crew fought twenty-seven fires; only forty-six acres were burned. The size of the average fire was reduced from twenty-seven acres to less than two acres.

Another lookout tower was needed in the southwestern part of the county, but the state did not have sufficient funds to build one. So the association went to the local lumberman and begged enough lumber and labor to build the tower. The state then supplied the needed hardware and a construction foreman; and a job, which at first looked impossible, was completed in record time. Another motorized crew, jointly financed by the association and state, was established at the new tower and 75,000 additional acres were receiving intensified protection.

All this had its effect on the county court and finally, in 1943, that body voted unanimously to budget $1000 annually for fire control. This money, like that contributed by the association was matched with state funds and two more motorized crews were activated.

The fire-control organization in the county is now almost complete. Its annual budget has increased from $2,000 to almost $10,000. Fire control funds, at first provided entirely by the state, are now provided by the state, the county and local individuals. At two fire danger stations fire hazard is measured daily in terms of wind velocity, rainfall, and moisture content of the litter on the forest floor. Six lookouts in high towers keep constant watch for smoke, and four motorized crews are prepared to attack fires the minute they are discovered. Scattered over the county, twenty-one fire wardens are paid a small annual retainer to do prevention work. This streamlined organization cracked down full force in 1943 and the already vastly improved fire situation improved still more. During

the five preceding years there had been an average of 150 fires each year; in 1943 there were only twenty-seven. The area burned was reduced from 12,000 acres to 3,000 acres, or less than one percent of the total forest land in the county. The goal of real protection is almost achieved.

Public interest in fire protection has increased accordingly. Driving from Waynesboro to Centerville one day recently, the writer picked up a trapper on his way to town to sell pelts and buy food. He was very loquacious, and after the conversation had drifted through trapping and the Scriptures, he launched into a homely sermon on the forest conservation, winding up with: "Mister, I would shoot my own brother if I caught him firin' the woods."

Public interest in other forest conservation practices increased as fire control improved. When John Dial planted the first pine seedlings in the county in 1931, his neighbors were skeptical. They said that anyone who would plant pine "sprouts" on his farm "ought to be bored for a simpleton." Those trees are now fast approaching merchantable size and more than 126,000 additional seedlings have been planted on eroding hillsides by the former skeptics.

In 1942, the county agent began talking to farmers about woodland management, telling them that the woodlot was just as much a part of the farm as the cropland and that it would make a valuable contribution to the farm income. A few farmers caught the idea and helped set up woodland management demonstrations on their farms.

Ten such demonstrations, involving more than 2,000 acres of farm woodland, have been set up so far, and 2,500,000 board feet of timber has been selectively marked for cutting. This timber which is being removed to *improve* the woodlands, is also providing critically needed wood for war uses and income for the farmers.

When the farm woodland demonstration program was started, Gordon Jenkins, the vocational agriculture instructor at Waynesboro High School, saw an opportunity to teach forestry to his farm boys. An interested timberland owner gave him a forty-acre tract of cutover pine and hardwoods and the boys went to work. They have already marked the boundaries of the tract, set up a stand improvement test plot and sold some fuelwood. Future plans call for growth study plots, fertilizer test plots and reproduction plots.

Ralph Hughes, president of the Hassel and Hughes Lumber Company, has probably done more for forest conservation than

any other one person in the county.

In 1943, the Hassell & Hughes Lumber Company had to make a major decision. Most of the pine sawtimber had been cut on their 70,000-acre holdings and nothing much but low-grade hardwoods remained. Should they complete the liquidation of their timber and go out of business—or should they revise their cutting practices and plan a permanent operation? TVA foresters made a reconnaissance of their best 50,000 acres and found that it was financially possible for the company to continue in business if they were willing to make the necessary adjustments.

The inventory showed a present timber volume of 81,000,000 board feet—40,000,000 in low-quality trees rejected by previous loggers, and 41,000,000 in good trees which had not yet reached sawtimber size. Company officials studied the inventory figures and began making the necessary operational changes. An employee, trained to mark timber, was instructed to mark for cutting nothing but low-grade hardwoods. The logging tempo was slowed down from 7,000,000 board feet a year to 3,000,000. To compensate for this reduction in raw materials, the company's mill began producing finished dimension items instead of rough lumber. More time was spent in manufacture and the products brought a higher price; income and employment did not decrease.

The present stand of timber is growing new wood at the rate of 5,300,000 board feet each year. If 3,000,000 feet are cut each year the annual *net* gain in volume will be 2,300,000 feet. After ten years of this kind of management the volume of timber on the 50,000 acres will have increased to 100,000,000 board feet, and the stumpage value of the property will have made a net gain of approximately $100,000. Then the company will have within sight its ultimate goal—a stable industry based on a growing stock of 150,000,000 board feet of high-quality timber and a perpetual annual harvest of 7,500,000 board feet.

Here, then, in Wayne County is the answer to every forester's dream: adequate fire control, a public appreciation of forest values, and a stabilized lumber industry. Here at democracy's very roots, the people have demonstrated that individuals and industry, working with government, can restore to productivity a sadly depleted forest source. "Grass roots" action can be expected to produce similar miracles if other citizens will but assume their responsibilities.

Hormone Magic for Tomatoes

Reprinted by permission from Seed World

Eugene Olshansky

TOMATO GROWING to-day is undergoing a quiet revolution which is every bit as amazing as the other phenomenal advances in the science of agriculture. The simple process of spraying the flower cluster of the tomato plant with a chemical solution is yielding results which are nothing short of magical. The active hormone in this solution produces so many unbelievable phenomena that a product of this type is truly an advertising man's dream.

The tomatoes that are obtained from hormone-treated plants mature from two to four weeks earlier, are larger, well-filled, contain more meat, and are obtained in greater yield because of the increased fruit-set obtained from treated plants as compared with the fruit-set on untreated plants. As if this were not enough the tomatoes from the hormone treated flowers are much finer in quality, possessing a more delicious and sweeter flavor, and, to top off this series of remarkable results, these tomatoes are SEEDLESS.

These are not idle pipe-dreams. These are matters of scientific record. Intensive research in the laboratories and greenhouses of the United States Department of Agriculture, Universities, State Experiment Stations, and private research institutions have conclusively demonstrated the advantages to be obtained from hormone treatment of tomato plants. Complicated procedure is not necessary and ordinary spray equipment can be used. The home gardener can use his own spray-gun and commercial growers can use standard equipment which they already possess. In spraying the flowers it has been shown that equally effective results may be obtained from spraying the back or side of the flowers, as well as the front of the blossoms.

As magical as these things are. there are, nevertheless, sound scientific explanations for them. The chemical compounds which are responsible for these remarkable improvements are popularly known as plant hormones although scientists prefer to call them "growth regulating substances." These hormones, and there are a variety of them, some more effective than others, have the unusual power of inducing artificial setting of fruit when

Reprinted by permission from the Seed World, April 5, 1946, Chicago, Ill.

they are sprayed onto the tomato blossoms. This takes the place of natural pollination and results in seedless tomatoes. It also insures more complete setting of each cluster since this process does away with the more or less incomplete pollination effected by the natural methods on which normal fruit-setting depends. As a result there is a much greater yield of tomatoes produced per plant as compared to untreated plants.

As a specific illustration of this particular point, it is well-known that the first flowers which bloom in the Spring usually fall off due to the inclement weather in the early growing season. The hormone strengthens the attachment of the flower to the stem, thus these flowers remain on the plant and develop into tomatoes which normally would not be obtained. These first tomatoes are obtained from four to six weeks earlier than would have been obtained from the flowers of the second cluster. The earliness of these tomatoes is also due to the more rapid growth of treated tomatoes, as well as to the fact that the first flowers were prevented from falling. Actual reports from the field have shown that five times as many buds have set fruit on treated plants as on untreated plants. These tomatoes were observed to grow more rapidly and to a larger size than did tomatoes on untreated plants. Similar results were obtained in the growing of tomatoes in the greenhouse.

The tomatoes produced from hormone treated flowers are well-filled, contain more meat, and have an exceptionally delicious flavor and sweeter taste. The flavor is further enhanced by the absence of seeds which normally are themselves bitter to the taste. The improved flavor quality is a point which should be of great value to commercial and home canners of tomato products.

Perhaps the most unusual of all these phenomena is the fact that properly sprayed flowers produce tomatoes which are completely seedless. In spraying the flowers it is necessary to spray them before natural pollination takes place in order to obtain completely seedless fruits, although spraying soon after pollination has occurred will give all the other advantages of this process. However, there is usually a fair safety margin between the opening of the flower and pollination during which time the spray may be applied to obtain complete seedlessness. If some of the flowers have opened when the cluster is sprayed the other buds will show the advantages of the hormone treatment and the open flowers will have all the advantages, too, with the exception that they will contain some seeds. In this connection, research has

shown that spraying a cluster when only one or two flowers are open will actually set fruit on unopened buds as well.

As previously noted there is a variety which may be used but not all of them produce the same results. Some will yield tomatoes which are puffy, tomatoes which have large cavities and less meat. Other products will produce tomatoes which have a sour taste, despite the absence of the seeds. Therefore the choice of a suitable hormone, one which will have all the desirable effects and none of the undesirable ones, is a matter of great importance. It is of especial interest to note that one particular hormone may be used in one concentration to promote parthenocarpic (seedless) growth of tomatoes and in a much heavier concentration this same chemical is used as a weedkiller. There are other chemicals than this one which are much better suited for use with tomatoes, and other vegetables.

It is already a matter of scientific record that these hormones will also produce seedless peppers, squash, and egg-plant, although to date their greatest application has been to the tomato, which is the most sensitive to hormone action. As a matter of fact seedless watermelons have actually been produced in research investigations, but this has not yet reached the stage where it may be commercially applied.

Cheaper Than Feed

Maybe a tree shelterbelt is the cheapest feed a cattle fattener can grow. Henry Hadenfeldt says the one he planted in Buena Vista county, Iowa, had the same effect as moving his feed lots south more than 200 miles. A steer must eat feed to keep himself warm, in addition to that required for gains. The warmer his lot is made in severe weather the less grain he needs for bodily warmth.

—*Capper's Farmer*

Preparing Calf for Show Ring

Reprinted by permission from Hoard's Dairyman

I. W. Rupel

Success in the show ring depends on efforts that have been operating for quite a period before show day. Fitting is 75 to 90 per cent feeding. So the suggestions made here are from the long time approach to fitting.

Preparations for the show ring can easily be divided into three parts: 1, feeding; 2, training; 3, fitting.

Feeding the Calf

It has been our observation, after judging at many county, district, and state fairs, that a high percentage of animals from fair to fair are underdeveloped and underconditioned.

What is the ideal condition for an animal toward which every showman should strive? The animal should be neither too fat nor too thin. From the breeder's standpoint too much fat is looked upon with suspicion for the future usefulness of the animal. In fitting, your objective should be the "happy medium" of good thrift, growthiness, condition, and bloom without having the animal overfat.

There is no single definite feeding formula that is the one way to condition a calf. As a general rule, good feeding means good quality roughage fed to the full appetite of the animal, and concentrates fed in sufficient amounts to promote good gains. Adjust the protein content of the concentrate mixture to the kind and quality of roughage fed.

The concentrate mixture, when fed with good quality hay, should contain approximately 70 per cent farm grains, 20 per cent wheat bran, and 10 per cent protein-rich feed, preferably old process linseed oil meal.

If lower grades of hay are used, the protein content of the concentrate mixture should be increased. For example, with mixed hay the linseed oilmeal should be increased to 15 per cent; with timothy or grass hay, linseed meal should be raised to 20 per cent. The corn and oats portion of the mixture should be reduced to allow for the adjustment.

Every showman has his pet formula of feed ingredients for the fitting ration. To us, however, the proper fitting from the feeding standpoint is a reasonable ration abundantly fed over a long enough period to get the animal into good body condition.

Keeping the calf in good condition from birth is important. If

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special attention is going to be given to a fitting ration, certainly it should start at least six weeks before showing, and preferably two months or longer. There are farms where the calf raising and development program is such that you could lead the calves out of the barn any time of the year and they would be in show shape.

Training the Calf

There are three steps in training the calf for the show ring: 1, halter-breaking; 2, leading; 3, posing.

Halter-breaking can be accomplished by tying the calf when very young and allowing it to stand a little while at a time. You can put a halter on a calf when it is a week or ten days old. At first tie it for an hour or two at feeding time. The calf will soon get tired of pulling back on the rope. If a rope halter is used, be sure it is the kind that the calf cannot readily loosen.

Leading — It is better to give the calf regular, comparatively short lessons in leading over a long period of time than to give long lessons at irregular intervals over a shorter period. You can teach the calf to lead and pose in 20 to 30-minute lessons several times a week over a period of six weeks before show day, and it is much easier on both teacher and pupil. In these days of farm labor shortages a short leading lesson in the evening after the day's work fits better into the production-for-victory program and the farm work schedule.

Posing — First of all, the leader must know what he wants the calf to do. What is a well-posed position for the calf to take? Study dairy and farm papers and bulletins for pictures of well-posed animals. Study your own individual calf to see what position will show it off to best advantage. You should pose your animal in such a way as to minimize faults.

Generally speaking, the legs should be squarely placed under the four corners of the calf so as to display levelness of topline, especially through the back and rump. Avoid overstretching, or other positions that tend to cramp the calf.

In milking animals, the feet should be so placed as to show the udder to good advantage without throwing the body out of line. There are two positions that will gain this end. In the one position the hind leg nearest the judge is advanced to show both fore and rear udder. The other choice is to have the hind leg nearest the judge moved sufficiently to the rear to expose the greater part of the entire udder in front of the leg. When this position is used, avoid overstretching.

Animals that have a tendency

to be low in the back should be posed with their feet well under the body so as to support the top-line, and such animals should never be overstretched.

After the showman has studied his animal sufficiently to know what he wants the calf to do, the next step is to train the animal to do it. This can only be accomplished through continued drill and practice.

The calf should be so trained that when the leader stops, the calf naturally assumes a correct postion. In any case, the training should be carried to the point where the calf can be led into the desired position with the least amount of pushing, shoving, pulling or stepping on toes. The less the showman displays his own efforts in posing the calf — the better.

Which side should you lead from? Standard show ring procedure calls for the leader to lead from the left side of the calf. Usually the showman leads with his right hand, and unless otherwise instructed moves clockwise around the ring.

When leading in the show ring, be sure to make the circle large enough to avoid crowding either the animals or the judge. Don't lead your animal too close to the one ahead of you. Keep enough space in the center of the ring so the judge can properly view the animals and work easily.

After your calf is posed, keep it alert, particularly when under observation by the judge.

Fitting the Calf

There are six points to be considered in fitting. They are: 1, blanketing and brushing; 2, clipping; 3, washing; 4, fitting horns and hoofs; 5, tail care; 6, night watch.

Blanketing and Brushing—Not many showmen attempt to fit animals when they are on pasture because they like to use blankets to condition the hide and hair, and also because stable feeding usually does a better job of maintaining body condition.

Blanketing is commonly begun one month or six weeks before the show. A light blanket will keep the hair straight and the flies off. Daily use of the brush and currycomb is desirable to get rid of old dead hair and dust.

Clipping — It is seldom necessary to clip the entire body, and this is especially undesirable immediately before the show.

Clipping is usually confined to the head, neck, face, ears, udder, and tail. Clipping on legs and underline should be done only as needed. On milking animals, clip the udder and milk veins. On heifers, you can leave the hair on the underline as it helps make them look deeper. Clipping about the head and neck should usually be done a few days

before the first show and may be repeated just before each successive show.

For beginners, we suggest you practice the art of clipping two weeks or more in advance, then you'll have time to correct your mistakes to some degree. Study the job of clipping that you want done. Realize that you can always extend the clipped area, but once you have clipped it you have to wait for the hair to grow back.

Washing — A bath may be given the calf before each show. This is particularly true for Holstein, Ayrshire, and Brown Swiss breeds. It may even be desirable to wash the calf a couple of times before the first show. For the lather we suggest using a good tar soap, preferred by many showmen.

The washing procedure includes four steps: 1, a thorough lathering and scrubbing; 2, a complete rinse; 3, blanketing after the bath to avoid getting the animal dirty; 4 hand rubbing when dry.

The hand rubbing conditions the hide and hair. For best results, rub with a little sweet oil which has been cut with alcohol (3 parts oil and 1 part alcohol) for the dark areas on the calf.

First rub sideways to the natural "lay" of the hair until the oil is well distributed. Then rub "with" the hair. This avoids streaking and pastiness.

Horns and Hoofs — Polishing horns and hoofs is a good deal like finishing a piece of lumber. You plane the surface, sandpaper it, then apply polish, and rub hard.

Treatment for horns and hoofs consists of removing first the excess scale with half round file or wood rasp, scraping with a piece of glass or a good horn scraper.

This is followed by "sandpapering" with a coarse grade and then with a fine grade of emery cloth. Then apply a paste of tripoli powder and sweet oil, and polish vigorously with a flannel cloth.

Hoofs should be trimmed so that the feet have a normal appearance and will permit the animal to stand normally.

Tail Care — The night before show day wash the switch with soap and water using bluing in the rinse, if needed, to remove stains. While the switch is still wet, braid it into many fine tight braids. Just before showing the calf, comb out the switch to a nice curly fluff. If needed, bluing can be used to bleach the stains on legs and flanks, too.

Night Watch — It is important that the night before show day a co-operative watch be maintained in the barn to "run the line" and keep the animals from soiling themselves.

Eradication of Japanese Honeysuckle

Condensed from Southern Agriculturist

C. E. Gapen

As an eradicator of the Japanese honeysuckle, "2-4-D" has given a good account of itself. A pest from the Orient, Japanese honeysuckle does most of its damage south of the Potomac and east of the Mississippi. It grows in tangled mats in fence rows, orchards, and woods, and sometimes far into cultivated fields.

U. S. Department of Agriculture specialists in weeds and in growth - regulating chemicals started testing 2-4-D (2, 4-dichlorophenoxyacetic acid) on the honeysuckle in 1944. Spray tests were made near Washington, D. C. A water solution of 1/10 of 1 per cent of 2-4-D was used. The patches were sprayed again in June and, although the growth was from one to three feet deep, the plants were killed off almost entirely. The experimenters say that thorough application seems to be more important than a concentrated solution. When growth is deep, more care is necessary.

The 2-4-D applied to Japanese honeysuckle kills certain other weeds, too. It killed broad-leaved dock, pokeberry, dogbane, smartweed, chickweed and goldenrod.

When the mat of vines rotted away from the first spraying, some annual morning glory, jimson weed, smartweed and poke seed germinated, but the second spraying killed them. The appearance in the fall of mustard seedlings, usually very sensitive to 2-4-D, showed that its effect disappears rather quickly.

The spray injured poison ivy and dewberry, but these plants and crabgrass, millet, goose grass, redtop and panicum had a tendency to fill in the ground after the honeysuckle was eradicated. The experimenters, therefore, advise planting useful grasses on the freed ground a month or two after spraying. They also think it is a good idea to delay planting sensitive crops, including legumes, from three to four weeks in most soil, and perhaps three months under dry conditions—some, like tomatoes and clovers, three months even under moist conditions.

Some special cautions are: prevent drift of spray to plantings of sensitive plants, such as beans and tomatoes, or to young shoots of apple, pear and peach. Many other crops are sensitive—so sensitive that it is very important to wash all equipment used for 2-4-D with hot water and washing soda and rinse thoroughly. There have been some disastrous results from using 2-4-D contaminated equipment for other spraying.

Costly to Plow Corn Deep

Condensed from Capper's Farmer

WHEN a well-prepared seedbed has been prepared for corn in mellow-soil, there is little point in cultivating the crop other than to control weeds, tests at Illinois Experiment Station indicate. If the soil is heavy so that it cracks as moisture evaporates it may be beneficial to cultivate in order to create a mulch that will hold down evaporation. All cultivation should be as shallow as possible, especially after the first time. Deep cultivation when roots have pushed to centers can do more damage than good.

This information is old. Some of it was developed 50 years ago, but the annual debate on whether to plow often or infrequently, shallow or deep, continues. The 4-year average yield of corn not cultivated, but with weeds controlled by scraping them off with a hoe was 72.9 bushels an acre. That is 2.1 bushels an acre more than the yield when the crop was tilled 4 or 5 times with cultivator shovels set deep. Shallow cultivation produced 5.1 bushels an acre more than deep cultivation.

In other Illinois tests an 80.7 bushel average was obtained for 4 years where weeds were scraped off with hoe and corn roots were left undamaged. To determine how much yield is reduced by breaking roots with deep cultivation, plots tilled exactly like those where the 80.7-bushel average was obtained had the roots cut with a knife where cultivator shovels would have broken them if the crop had received a deep cultivation. This disturbance to the root system lowered yields 16.9 bushels an acre.

That indicates that deep cultivation is costly after corn's root system is established. In this series of tests, 4 or 5 shallow cultivations produced an average 4-year yield of 4.8 bushels an acre less than was obtained from plots where the only cultivation was scraping weeds off at the surface with a hoe. Four to 5 deep cultivations gave 5.1 bushels an acre less than the same number of shallow cultivations, and 12 to 14 deep cultivations gave lower yields than 4 to 5 deep ones.

Later the Illinois Station ran another series of tillage experiments with corn. The general level of yields in this test was considerably lower than that of the earlier ones. Where the ground was not plowed or cultivated as seedbed preparation, the

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average yield for 9 years was 35.2 bushels when the only tillage given was scraping off weeds with a hoe. Where the ground was plowed and a good seedbed prepared the yield was 13.7 bushels an acre higher when scraping weeds with a hoe was the only cultivation given. In this test 3 shallow cultivations yielded an average of 5.6 bushels an acre less for the 9-year period than was obtained from plots where the only tillage given was scraping weeds off with a hoe. Where a good seedbed was prepared and weeds were allowed to grow unhampered by hoeing or cultivation, the yield was only 7.4 bushels an acre. It would appear, therefore, that keeping down weeds resulted in an increase of 41.5 bushels an acre and the preparation of a good seedbed was responsible for an increase of 13.7 bushels, other conditions being the same

Livestock Shorts

A few cents per head invested in minerals for hogs pays well. Florida tests show that hogs grazing peanuts (and fed no minerals) produced 238 pounds of pork per acre. When they got salt, too, they gained 266 pounds, and when given calcium carbonate and salt the gain was 301 pounds.

—*Farm Journal*

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

A Living from Bees—By Frank C. Pellett, Field Editor of American Bee Journal. Orange Judd Publishing Co., Inc. $2.25.

America's Garden Book—By Louise Bush-Brown and James Bush-Brown. Charles Scribner's Sons. $3.50.

An Agricultural Testament—By Sir Albert Howard, C.I.E., M.A., former Director, Institute of Plant Industry, Indore. Oxford Univ. Press. $3.50.

Animal Sanitation and Disease Control—By Dr. R. R. Dykstra, Dean, School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $2.85.

Beef Cattle Production in the South—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers. $2.00.

Breeds of Livestock in America—By Henry W. Vaughan, formerly Prof. of Animal Husbandry, Iowa State College. College Book Co. $3.75.

Dairy Cattle Feeding and Management—3rd Edition—By H. O. Henderson, Prof. of Dairy Husbandry, W. Va. Univ., Carl W. Larson and Fred S. Putney. John Wiley & Sons, Inc. $4.00.

Dairy Science—By W. E. Petersen, Ph.D., Assoc. Prof. Dairy Husbandry, Univ. of Minn. By R. W. Gregory. J. B. Lippincott Co. $4.00.

Diseases and Parasites of Poultry — By Edgar Hugh Barger, D. V. M., Berkeley, Calif., and L. E. Card, Ph.D., Prof. of Poultry Husbandry, Univ. of Illinois. Lea & Febiger. 3rd Edition. $3.75.

Farmers of the World—The Development of Agri. Extension—edited by Edmund deS. Brunner, I. T. Sanders, Douglas Ensminger. Columbia Univ. Press (1945). $2.50.

Forestry in Farm Management—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. $3.00.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.
Available October 1

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.50.

Farm Management and Marketing—By V. B. Hart, M. C. Bond, L. C. Cunningham, all of N. Y. State College of Agriculture, Cornell University. John Wiley & Sons, Inc. $2.75.

Grow Your Own Fruit—By M. G. Kains, formerly U. S. Dept. of Agri.; Prof. of Horticulture, Penna. State College. Greenberg, Publisher. $3.50.

Growing Tree and Small Fruits—By H. B. Knapp, Director, State Institute of Applied Agri., Farmingdale, L. I., N. Y., and E. C. Auchter, Chief, Bureau Plant Industry, U. S. D. A. John Wiley & Sons. $2.75.

How to Raise Rabbits for Food and Fur—By Frank G. Ashbrook, Fish and Wildlife Service, U. S. Dept. of the Interior. Orange Judd Publishing Co., Inc. $2.00.

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

Livestock Production—By Walter H. Peters, Chief, Div. of Animal and Poultry Husbandry, Univ. of Minn. McGraw-Hill Book Co., Inc. $4.00.

Livestock Judging Handbook — By Julius E. Norby and W. Malcolm Beeson, Ph.D., Asst. Professors Animal Husb., Univ. Idaho. The interstate Printers. $2.60.

Modern Agricultural Mathematics—By Maurice Nadler, B. S., A. M., Dept. of Mathematics, Newtown High School, Long Island. Orange Judd Publishing Co., Inc. $2.00.

Modern Farmers' Cyclopedia of Agriculture—By Earley Vernon Wilcox, Ph.D., formerly U. S. Dept. of Agri. Orange Judd Pub. Co., Inc. $4.50.

Natural Principles of Land Use—By Edw. H. Graham, Chief of Biology Div., Soil Conservation Service. Oxford University Press. $3.50.

Palestine—Land of Promise — By Walter Clay Loudermilk, assistant chief of the Soil Conservation Service. Harper & Brothers. $2.50

Pay Dirt—Farming and Gardening with Composts — By J. I. Rodale. Devin-Adair Co. (1945). $3.00.

Pleasant Valley — By Louis Bromfield, author, farmer, soil conservationist. Harper and Brothers. $3.00.

Pork Production — By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

Poultry—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry. Mo. State Univ. J. B. Lippincott Co. $5.00.

Practical Farming for the South — By Benjamin F. Bullock, now Prof. Rural Education, Atlanta Univ. Univ. of North Carolina Press. $2.50.

Profitable Poultry Keeping—By H. Clyde Knandel, Head, Dept. Poultry Husb., Penn State College. Orange Judd Publishing Co., Inc. $3.00.

Repairing Farm Machinery—By Ivan G. Morrison, Asst. Professor Agri. Education, Purdue Univ. The Interstate Printers & Publishers. $1.80.

Seaman A. Knapp—Schoolmaster of American Agriculture—By Joseph C. Bailey, Dept. History and Social Science, Hunter College. Columbia University Press. 1945. $3.25.

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Book Co., Inc. $4.50.

Soil Conservation—By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Dept. of Agric. McGraw-Hill Book Co., Inc. $6.50.

Successful Poultry Management—By Morley A. Jull, Professor and Head of Poultry Dept., Univ. of Maryland. McGraw-Hill Book Co., Inc. $3.50.

The American Land — Its History and Its Uses — By William R. Van Dersal, biologist in the U. S. D. A. Oxford University Press. $3.75.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

Weeds of Lawn and Garden — By John M. Fogg, Jr., Prof. of Botany, Univ. of Penna. University of Pennsylvania Press (1945). $2.50.

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Publishers: McGraw-Hill [illegible] $2.50.

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The United States has a unique responsibility in the world program for peace, and for the building of an expanding world economy. One of the obligations that goes along with being the richest, most productive nation in the world is that we set the pace. In this country we have only about six percent of the world's people, but we produce somewhat more than half of the world's goods. We have more than half of the power, we turn out about sixty percent of the manufactures, and ours is the mightiest, the most productive agriculture. . . . Fortunate as we are in having a highly developed, integrated economy, we cannot expect to prosper indefinitely in a depressed world. . . . United States agriculture has certain broad assignments, against which we should measure all of our policies, plans, and action programs.

CLINTON P. ANDERSON
Secretary of Agriculture